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ceramic finishes on metal

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THE Finish Line

Over-optimism is not healthy — but — pessimism wins few battles in war or business.

Of all those connected with the enameling industry and allied fields with whom I have had the privilege of talking in recent months I am happy to say that only two men have held a pessimistic viewpoint for the future of the industry — One an equipment manufacturer; the other, the head of a porcelain enameling company. All others contacted have presented, in varying degrees, a bright outlook for the future.

What we should hope for in order to build for a sound future is optimism — not over-optimism — certainly not pessimism. In other words, a "middle-of-the-road" state of mind that leads to hard work built on confidence in the future.

What about future business?

In this connection we would like to commend for your reading the article in this issue, by Bob Weaver, entitled "The Place of Porcelain Enamel in a Postwar World." Here's a man who, having been a leader in the industry over a period of years, is qualified to speak with authority. The time encompassed by his experience also covers the normal "ups and downs" in business cycles that must be anticipated by any industry.

You will notice that Mr. Weaver acknowledges the possibilities of keen competition from a number of finishes and products, but his presentation unquestionably ends on an optimistic note as far as future business for porcelain enamelers is concerned.

Business from where?

For the enameler who wants to "pin down" the possible sources of future business we suggest the reading of Rex Newcomb's article, "230 Million Dollars Worth of Production for Enameling Plants."

Any prophecy for the future must, of necessity, open up the possibility of questions as to the accuracy of estimates. This is not new for Mr. Newcomb. He has studied and written on enameling subjects for a number of years. He has had access to the best sources for data, including both cooperative organizations and Government statistical agencies, in the assembling of background material and, in his present position, has a good opportunity for insight into the "Washington scene."

Neither Mr. Newcomb nor *finish* would expect wholesale agreement on his predictions. Some may prove optimistic — others should prove conservative. The information offered we believe to be constructive, and it should be enlightening to many.

A job to be done.

With optimism in the wind, and with millions of dollars of potential business facing the industry, the easy and natural course might seem to be to "sit back and wait" for developments. There is every evidence that the leaders in our industry realize that to do this would be to invite a "kick in the pants" from competition after the war.

From our observation, many of the frit, steel and raw material producers, jobbing shop operators, appliance manufacturers with enameling departments, and in some instances equipment manufacturers, are keyed to a keen sense of responsibility for cooperative effort in the development of newer and better products, and a follow-through with new and improved standards of processing technique.

With the right correlation of this effort, and a continued "punch" behind it, porcelain enamel should be headed for the brightest future ever.

Dana Chase

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230 Million dollars worth of production

for enameling plants

By Rexford Newcomb, Jr. • CERAMIC CONSULTANT, CONSERVATION DIVISION, WAR PRODUCTION BOARD, WASHINGTON, D. C.

This article has been approved for publication by W.P.B. Division of Information. It should be noted that although the author is employed as ceramic consultant for the War Production Board, the opinions expressed in this article, relative to ceramic production, are his own and in no way reflect the official viewpoint of the War Production Board.

IN AN attempt to evaluate the future prospects for domestic production in the various lines of porcelain enameled product manufacture, a study has been made of the more important end-products of the industry, by comparing production statistics for 1939, as a representative prewar year, 1943 as a representative wartime year, and a hypothetical year, indicated as V+, as a year representative of the immediate postwar period.

The necessary production data for 1939 and 1943 has been obtained from a variety of trade associations and government agencies; estimates for postwar production are based entirely on the author's own apraisal of the industry.

Badly hit by the war is the group of plants manufacturing porcelain enameled products, total output of which has dropped from $171 million in 1939 to $43 million in 1943. The reason for this tremendous drop is that the great bulk of enameling is normally used on consumers' durable goods for which the base metals, cast iron and steel, are not available in time of war. Even with improving supplies of such metals, large scale production of household appliances will not be possible until the other components — small electric motors, compressors, belts, rubber-covered cord and the like—are again available. Early in the war most of the plants of this industry converted their facilities to the manufacture of direct military goods involving no enameling.

Signs

One of the old standbys of the industry, and the product that originally put many enamel jobbing shops in business is sign work, in recent years bolstered by the production of architectural procelain parts. These two products are closely allied in that both are normally produced in the same plants of the industry, and in each case on special orders, requiring some engineering and color matching as compared with the great bulk of standardized white enamel in the holloware and appliance industries.

The output of enameled signs totaled $3.8 million in 1939, a volume which shrank to a bare $241,000 in 1943, due entirely to the shortage of steel. The postwar period undoubtedly will see considerable expansion in this field, due to resumption of outdoor advertising campaigns, renewed construction of improved highways, and a new development, "sky signs." Several national advertisers are becoming aware of aerial traffic which will greatly increase after the war, and it is reported that a large tire manufacturer is definitely planning on the installation of a number of porcelain enameled sky signs with the company's trademark in letters 100 ft. long. On a very conservative estimate, the postwar sign business should be at the level of at least $4.5 million per year.

Architectural parts

The postwar period will bring increased use of architectural porcelain for both utility and beauty. Certain firms in the enamel industry have been carrying on a broad educational campaign to acquaint architects and builders with the merits of porcelain enamel. Increased building of gasoline stations, always a good market for architectural porcelain, with stations located in the country to service both ground and air traffic, will call for enameled buildings. One management - engineering firm has predicted $10 million worth of filling station construction per year for 10 years after the war. This would require about $1.5 million worth of enameled parts annually. In other types of construction, enameled parts such as flue liners, spandrels, flashing, shingles, window trim, partitions, elevator cabs, gravel stops, shutters and siding, will be much more widely used. Worthy of mention here is a new type of corrugated enameled sheeting, for use as roofing and siding, which will withstand considerable bending without cracking. The coated sheets have good impact resistance and can be cut on the job with an acetylene torch. The heat of which is said to cause the enamel to flow sufficiently at the cut edges to cover the new cut and thereby protect the metal from corrosion.

Another possibility in construction embodies the use of double-walled units of enameled steel, perhaps 3 or 4 in. thick, with the space between filled up with Fiberglas or some other type of fireproof, sound and heat insulation. Exterior walls would be built up by welding such enameled sections directly onto the structural

PHOTO COURTESY AMERICAN ROLLING MILL CO.

A remodeled theatre with load-bearing, light-weight concrete units faced with porcelain enamel. Ornamentation done with three-color stencil process. Ashlar units edged with stainless steel. Architects: Bennett & Straight; Contractor: Burnett & Henige Co. — both of Detroit.

A "relatively conservative estimate" says $3.5 million per year for architectural porcelain after the war is won.

steel framework in an extremely simple type of construction. Architects feel that the welded steel framework of a modern building provides all the strength necessary; masonry facing is no longer needed. In view of these many encouraging signs, it is felt that the postwar production of architectural porcelain enamel will considerably exceed the 1939 volume of $1.8 million. For the purpose of the present paper, however, a relatively conservative estimate of $3.5 million is used.

Home appliances

By far the greatest use of porcelain enamel is in products used in the home, specifically in the bathroom, kitchen and laundry. Such products — stoves, refrigerators, plumbingware, table tops, cooking ware, water heaters, sinks, trays and washers—accounted in 1939 for 92% of all the enameled products produced in the country. Therefore, the construction of new housing facilities and the modernization of kitchens and bathrooms are of paramount importance in the enamelware industry.

The production of cooking appliances, which totaled for gas, oil, coal and wood, 3,058,000 units in 1939, in addition to 335,000 electric ranges, 235,000 electric roasters and a million electric hot plates, required porcelain enameled parts with a total value of $53.2 million. This figure includes enameled parts produced in the "captive" porcelain plants of the stove industry, as well as the output of plants producing stove parts wholly on a jobbing basis. Due to the extreme curtailment of production, 1943 output of cooking appliances amounted to only 1,600,000 units, including a Government order of 7,000 electric ranges, the great majority of which were "Victory" models, designed to conform with War Production Board requirements on metal weight, with the result that many manufacturers substituted abestos-cement boards for sheet steel on the ends of the units, replaced metal bases with wood, removed burner top covers, and cut metal weight in other ways. This reduced the demand to such an extent that the total 1943 production of enameled parts for cooking stoves and ranges was in the neighborhood of $7.6 million.

Heating stoves; 169,000 units for coal and wood heat, plus 730,000 Kerosene and distillate room heaters, in 1939 required another $2.5 million worth of enameled parts. Use of enamel for heating stoves in 1943 was at about $1 million worth.

It is generally agreed that porcelain enamel is the best finish available for stoves; and that the industry can expect to regain its important market in the stove industry after the war. Based on an estimated annual output of 5 million cooking stoves and ranges, including electric, in the immediate postwar period, the stove industry would require at least $60 million worth of enameled products. Most of the plants in the stove industry have been converted to direct war work, but many of them are in a position to reconvert to peacetime production in a very short time—only two weeks for some producers—which will enable them to maintain employment and offer jobs in the early part of the reconversion program.

Refrigerators

The total value of enameled products used in refrigerators in 1939 was $40.7 million which includes $9.2 million used for commercial refriger-

ators and display cabinets, $3 million worth of parts made in job shops for domestic mechanical refrigerators and $28 million worth made in the large "captive" enameling plants operated by the refrigerator manufacturers. Production of domestic refrigerators in that year was 1,900,000 units, sales totalled 2,085,000. Analysis of recent production shows that the average size of domestic units has consistently increased, so that the 6½ cu. ft. unit, once the largest in the domestic line, is now about the standard size. All electric refrigerators use porcelain enameled steel for the liners, but barely 10% of the units sold have porcelain exteriors; most of them are finished with baked organic finishes because of the great retail price differential. It is felt by the enameling industry that this differential is not consistent with actual production costs, and that some way must be found to narrow the gap between the respective retail prices. Any such trend would greatly increase the average amount of enamel used per unit.

Refrigerator production in 1943 was practically non-existent. There was a total of only $630,000 worth of enameled parts used for commercial units, and just one small order for military use of domestic units, involving $21,000 worth of enameled products. The great bulk of necessary civilian requirements was taken care of by ice refrigerators which used no enamel at all, because of the 6 lb. metal limitation governing their manufacture. As a consequence of this cessation of mechanical refrigerator production, it is generally agreed that the tremendous backed-up demand will require the manufacture of at least 4½ million units per year for at least the first 3 years after the war. Output on this scale, coupled with normal demand for commercial units, would require the annual production of about $82 million worth of enameled products. In case this forecast of 4½ million units seems unduly optimistic, it should be noted that 3½ million were sold in 1941. Allied with refrigeration is the air-conditioning equipment industry which also offers an attractive postwar outlet for enameled products, the volume of which cannot be estimated at this time.

PHOTO COURTESY ENAMELED UTENSIL MANUFACTURERS' COUNCIL

"The postwar possibilities for enameled kitchen ware envisions a market of $15 million worth, calling for production at 1939 level."

Washing machines

Another appliance of major interest in the home is the electric washing machine, sales of which in 1939 involved 1.3 million units which required $3.5 million worth of enameled tubs. Production of these enameled tubs in 1943 were zero; some washers were assembled from parts on hand, but no new tubs were manufactured. As in the case of ranges and refrigerators, a healthy pent-up demand exists which is expected to call for production of more than 2.5 million washers annually, requiring at least $7 million worth of enameled tubs. Enamel seems to be supreme in this application; no other satisfactory material for tubs has yet been advanced that can compete with the enameled unit in cost.

Smaller household items are table tops, drainboards, and laundry tub and tray combination units, aggregating $4 million in 1939, no output in 1943, and they should reach $5.0 million in the postwar period.

Plumbingware

In normal times, a very large amount of enamel goes into plumbingware, the 1939 output of which totaled $43.3 million. Largest single items were $20 million for bath tubs, $7 million for lavatories, $12 million for sinks and $1.5 million for steel shells and tanks for water heaters. The major part of the first three items was made of cast iron, although sheet steel units have in recent years accounted for an increasing share of the total. In the year just past, total output reached only

XUM

PHOTO COURTESY CRIBBEN & SEXTON COMPANY

Production of cooking and heating appliances has, in the past, always held first place in the use of porcelain enamel. There seems little doubt as to the ability of the industry to hold this important field, with accelerated use in proportion to the increase in product production — $60 million worth of enameled metal products estimated.

"Tremendous backed-up demand." Domestic and commercial refrigerators may require $82 million worth of enameled products which, if realized, will pass probable stove industry requirements. Table tops, sinks and other equipment will add materially to porcelain enamel that will be used in the kitchen of the future.

PHOTO COURTESY FRIGIDAIRE DIVISION, G.M.C.

$4.1 million, of which enameled water heaters amounted to $1.2 million. The heaters were used in corrosive water areas, chiefly for defense housing projects. Of the balance, much of the dollar volume was in water closet bowls, urinal troughs, and wash fountains purchased under military orders for shipboard and army hospital use. A very conservative estimate for postwar production would call for at least $48 million worth of goods in this category, or production at about the 1941 level. Predictions concerning the construction of 1,300,000 new housing units annually would seem to indicate a market potential greater than $48 million for enameled plumbingware, but competition of vitreous chinaware and perhaps glass might secure an increasing share of the business.

Holloware

The only major segment of the enameling industry not curtailed by the war is the group of plants making kitchen and hospital holloware. The 1939 output of this industry, $15.1 million, was less than 10% of the total enameling business; its 1943 volume of $21.5 million amounted to almost 50% of the total for that year. The actual increase was partially accounted for by sizeable orders from the Army, Navy and Maritime, in addition to substantial export shipments. While the postwar period undoubtedly will bring increased demand for enameled holloware for export, very strong competition for the domestic market will be felt from manufacturers of ware made of aluminum, stainless and stinless-clad steel, copper and glass. Because of the inter-industry battle sure to develop for the cookware market, a realistic appraisal of the postwar possibilities for enamel kitchenware envisions a market for not more than $15 million worth, calling for production at the 1939 level.

Other products

Another group of plants that has enjoyed good wartime business is that group of jobbing plants manufacturing enameled reflectors, output of which increased from $1.8 mil-

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The place of porcelain enamel

in a postwar world

(a comparison with competitive products and finishes)

By R. A. Weaver • PRESIDENT, FERRO ENAMEL CORPORATION, CLEVELAND, OHIO

AT THE Cincinnati meeting of the American Ceramic Society in 1934, I read a paper the title of which was "An Ancient Art Becomes a Modern Industry," outlining the splendid history of Porcelain Enamel. It is not necessary to again go into the history of Porcelain Enamel today except to say that its origin is lost in antiquity and that we have many beautiful examples of the art that are over a thousand years old.

The ancients not only wanted an outlet for their artistic urges, but they soon found that protective finishes were necessary for *objects of ordinary use* as well as objects of art. In the Orient, it is written that man developed colored pencils for decorative purposes as early as 4000 B. C. These were made by mixing pigments with clay.

Biblical quotations in the first book of the Bible (Genesis 6-14), and unearthed records of Egyptian excavations indicate the use of a bitumen composition of some sort. It has been suggested that the coating materials used on mummies and cases were probably asphaltum dissolved in a volatile oil.

In the Far East, the natives had their lacquers. And our own Indians covered their canoes with a protective coating of black paint and decorated their faces with berry stains, colored clay, and charcoal made from red cedar.

So all through history we note the desire for color and the necessity for protective coatings. There has consequently always been a reward for those who could bring about in one finish a combination of color, beauty and longer life. The last attribute has been important because of the terrific toll taken of metal by corrosion.

As the less expensive metals came into general use, the importance of satisfactory finishes grew greater. They were needed:

1) To improve resistance to corrosion and tarnish.
2) To improve wearing properties or surface characteristics.
3) To improve appearance.

The factors which controlled the characteristics of the finishes were:

1) Dimension limits of machined parts, which controlled thickness.
2) Adequacy of protection which also controlled thickness.
3) Flexibility of parts.
4) Stability under special conditions; e. g. high temperatures, acid resistance, etc.

In general, protective coatings have to be applied to ferrous metals artificially. Roughly, the various types are:

1) Coatings of other metals applied by electrodeposition.
2) Coatings of other metal applied by immersion.
3) Conversion of the surface of the metal to one of its more resistant compounds.
4) Spraying with a more resistant metal or alloy.
5) Cementation.
6) Cladding.
7) Application of an organic coating, usually but not always a paint or lacquer.
8) Porcelain enameling.

Electrodeposition is the most commonly used process and since 1940 we have plated with zinc, copper, nickel, tin, lead, etc. The characteristics of these coatings are:

Smoothness, fineness of grain.

Irregularity in thickness according to shape of piece.

Tendency to porosity unless process and solution carefully controlled.

Adherence poor, unless surface is carefully prepared.

Immersion coatings

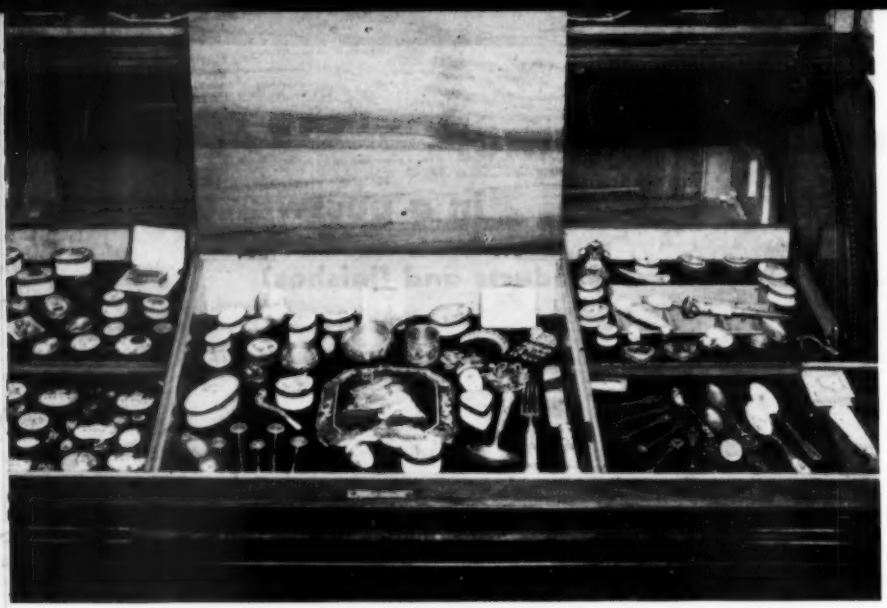
Except for Porcelain Enamel and lacquers, the immersion coatings are the oldest and most familiar of the protective finish processes. The Romans coated copper vessels with tin, probably by immersion. The hot-dip tinning was a well established art by the first part of the 17th century. About 1740 the first coating with hot-dipped zinc was made, and a few years later Sheffield plate was discovered.

The process is commercially practical only with low-melting-point metals, because of the undesirable effects of high temperatures on the metals being coated. The coatings are almost always relatively thick and consequently the process is wasteful of material. There seems to be no simple and inexpensive way of controlling accurate weights of application or distribution over the surfaces involved. There is a tendency for these coatings to develop brittleness.

R. A. Weaver

Mr. Weaver, as president of his company, is vitally interested in the progress of the industry. He is an exponent of new uses for porcelain enamel and has done much in recent years to encourage expansion of its use for architectural purposes along with its standard uses in other fields.

XUM



A part of the author's enamel antique collection.

Generally speaking, coatings electrodeposited or dipped do not have color or beauty and do not compare with Porcelain Enamel as a protective coating, from a length of life standpoint.

Surface conversion

Modern developments, accelerated by war shortages, have given the so-called surface conversion materials a big boost. The phosphate coatings, such as Bonderizing and Parkerizing are examples. In general, they tend to be powdery on the surface; are highly absorbent and have little corrosion resistance in themselves. They must be impregnated with dye, oil, wax, etc., to make them serviceable. They do make a good base for paints and are desirable in riveted assemblies because of the insolubility of the coating.

There are some coloring processes in this field of surface conversion but they are only suitable for decorative indoor service. Chemical blacking, using alkali, nitrates, ureas, etc., are less expensive than the phosphate coatings, but not as satisfactory. Their corrosion resistance is negligible compared with Porcelain Enamel. Oxidized finishes, produced by temperature, are generally protected by a colorless lacquer and will only withstand mild service.

Metal spray-cementation-cladding

Metal sprayed coatings are limited commercially to metals of low melting point and are usually used with zinc powder. They are a product of this century. They require a greater thickness of coating for same measure of protection against corrosion and are particularly adaptable for use on large installations already in place. This same scheme has been tried, using porcelain enamel, but, though samples could be made, the idea is not yet commercial.

Cementation involves the use of powdered coatings and has wide metallurgical applications. It is also a product of this century. Sheradizing and Calorizing are examples. They do not have color or beauty but some of the products in this field have displayed excellent corrosion resistance.

Cladding, as its name indicates, is a veneering process, but it is reasonably expensive and does not appear to compete with porcelain enamel. Stainless steel and aluminum are usually used.

Organic and unfused inorganic coatings

Last but not least, we have to briefly consider the organic finishes and the newer inorganic, but unfused coatings. You are familiar with the popularity of the synthetic enamels, organic in nature. Because of the low temperatures required they are suitable in places where porcelain enamel cannot be used. However, they are soft in comparison and our company, which makes both the synthetic and the real, generally speaking, doesn't consider them competitive. The unfused inorganic material has a place, during war time as a substitute for galvanizing but still has its spurs to win after the war.

Perhaps we have taken too long in considering the well-known finishes which have been generally known and available for years, but I wanted to show the wide variety of materials with which Porcelain Enamel has successfully competed in the past.

Some sage has said you can only judge the future by the past, on which basis, in my opinion, Porcelain Enamel has nothing to fear from the finishes just mentioned.

Light metals and plastics

But, you can properly says, "What about those materials which don't require finishes, the light metals, the plastics and other products mentioned so often as substitutes for Porcelain Enamel in the dream world pictured for us by the designer, whose stock in trade is his imagination?"

Aluminum and Stainless Steel we know about. They will be cheaper in price, but so will Porcelain Enamel. They do not have the beauty and color we offer. They have been tried on most of the products where Porcelain Enamel has been used and they have been found wanting. Magnesium has even less to offer.

Plastics—That's a name to conjure with. Feature writers say that automobiles, bath tubs, houses — everything will be made of plastics after the war. But they don't specify after which war. As a matter of fact, the feature writers have embarrassed the plastic producers with the fantastic claims which they have made for this thoroughly fine group of products.

The important men in the plastic industry have publicly announced that the designers have gone too far in their claims for the new products which will be produced from plastics.

In my opinion, the Porcelain Enameling Industry which gets its volume from the refrigerator, bath tub, range, washing machine and kindred industries, has absolutely

nothing to fear from the finishes we have discussed or the new materials which have been ballyhooed so much in the last few years, IF—

And that IF is in capitals. IF we do the job that is so clearly outlined for us to do.

Progress in porcelain enamels

And we are doing that job. Dr. McIntyre, head of Ferro's laboratories, last year in a paper presented before this Society, frankly listed the progress that had to be made in our industry if we were to keep pace with our opportunities. He ended his paper by saying, 'The challenge is here. We accept it. We shall solve the problems."

One of the problems was the reduction of fabrication costs. One of the suggested answers was the formulation of enamels which could be applied in one white or light colored coating on the metal bases without a so-called ground or grip coat and with no loss of production standards.

I'm happy to state that real progress has been made on that important problem during this last year. Final success will open up enormous new markets where inexpensive rust-proofing plus color are required. Corrugated metal roofing and metal shingles are just two of the many items that can be produced economically when these new finishes are finally developed.

Their final development will probably be delayed until the steel manufacturers have perfected new base metals on which they are now diligently working. I believe it's no secret —and it's certainly inspiring to know —that the steel manufacturers and the frit producers have been jointly working to make possible higher standards of quality, with lower costs, for the industry.

Dr. McIntyre further stated that "It appears that Porcelain Enamel (a new one developed for the purpose) under some specific conditions, will outlast stainless steel many times." Here again, I'd like to report that this new development has been brought to a successful conclusion during the last year. It's a finish for airplane exhaust stacks which take a terrific beating at temperatures usually associated only with Hades.

We must remember, though our product has developed from an Ancient Art, that it is only in very recent years that volume has permitted the spending of enough money to do a really thorough research job. Another difficulty lay in the fact that until recent years there was no literature on the subject and research technicians had to be trained.

Those of you who have known the industry for the last twenty years will remember the hip pocket enameler who inherited or bought a book of formulas and made his own enamels. In those days three and four coats of white were the rule and epidemics of fishscale were common.

"We have come a long way"

We have come a long way in a few years. And each year, as we learn more, we find more things that can be done with Porcelain Enamel.

Chipping has always been the great bugaboo in the industry. It was largely caused by a combination of too heavy application (due to the large number of coats), poor design, careless application, and perhaps poor equipment and base metal.

Practically all of these causes for chipping have been eliminated and those that haven't, soon will be. As a matter of fact, chipping has not been a problem in recent years in the well-run shops. But the memory lingers on, especially among consumers.

It will take some time and much effort to sell the public on the fact that today's technically produced finish is as different from the old enamel as the modern refrigerator is from the old ice box. But, this is a job we must do.

Industry prospects bright

The prospects for our industry in the postwar era are the brightest in our history. Many things are combining to bring this about. As of today, our business comes largely from the materials applied to those fascinating and beautiful items which make American kitchens and bathrooms the pride of our homes and the envy of all the rest of the world.

Business seers and statisticians in the home utility field agree that postwar sales of such products should reach phenomenal figures. In addition to the new buyers that have recently come into the market, and the millions that have long wanted such products but never before could afford them, there are still other millions whose present equipment is worn out or obsolete and needs to be replaced. Together, they represent a potential demand that will test the capacity of all our present producers and tempt new ones into the field.

You must always remember that the prosperity of the Porcelain Enameling Industry is closely tied

Recent photo of porcelain enameled home built in Cleveland by Ferro Enamel Corp. in 1932. Walls and roof are porcelain enameled shingles. Charles Bacon Rowley & Assoc., Inc., of Cleveland were the architects.

XUM

Porcelain enameled bathroom mural, designed and executed by Edward Winter, Cleveland artist, in the home of G. H. McIntyre.

to the producers of home utility equipment and they in turn are most prosperous when the building industry prospers.

All our trade and business papers and magazines have been printing the results of surveys indicating what the American public wanted after the war. Automobiles come first, but homes, refrigerators, ranges, washing machines, etc., come high up on the list. Remember also that in addition to the huge replacement market for our products, that the building of homes creates another very large new market. Tomorrow's buyers will have the desire for porcelain enameled products and they will also have the money. They have paid their installment debts (have lots of brand new credit), have money in the bank and substantial amounts of War Bonds on hand. Watch them go to town when they get a chance to buy!

New uses for Porcelain Enamel

In addition, our production capacity is going to be burdened with demands for Porcelain Enamel from many new users. We have already discussed the bright future of the newly developed enamels for corrugated roofing, shingles, etc., and we also have a vast potential market in other architectural fields. The use of our materials for gas stations is now almost standard practice. Its use for store fronts, hospitals, schools, etc., was steadily growing before the war and the demand is sure to increase after the war. All of the fine qualities of our material are useful in this field. Beauty, color, long life, low maintenance, cleanability, fireproofing—we have all the qualities they desire. Watch this field grow.

There is also a great and growing interest in the use of our material in the marine field. Here again, fire proofing, long life, low maintenance and cleanability are very desirable features. Bulkheads are finished in our material and other marine items are even now on the drafting board.

During the war the use of porcelain enameled hot water tanks to replace galvanized, copper and Monel tanks has taken a long step forward. This is a big and logical field for Porcelain Enamel.

If *my* guess is any good, there is a strong probability that you will be buried in a stamped metal casket, rustproofed and beautifully finished in Porcelain Enamel. This, in turn, may be placed in a metal grave vault finished in the same manner. We may even put an enameled grave stone or marker over the grave for good measure. It's been done.

The summary

Let's sum up. We have a material proven through the ages. It is rustproof, beautiful, colorful, easy to clean, sanitary, heat resisting, low in cost . . . and getting better and cheaper all the time.

The industry is sold on research and scientific control. Its technical men are gradually taking over its management and sales. It is ambitious, determined, hard working, has vision and is *confident* of the future.

In closing, I want to speak again of confidence. I opened my paper with reference to a possible lack of confidence. Now, I want to close on the opposite note. There is a story about the banker from the small town in Texas who was elected president of the American Banker's Association. When asked by a feature writer how he happened to go into the banking business he said, "We were all proud of our little town but didn't have a bank, so a friend of mine and I rented the only empty store room, put in a desk and counter, put a sign out in front and waited for action. We got it. Our Chinese laundryman came in the first day and deposited $250.00. Soon after a widow came in and left a similar amount. The next day our doctor put in $100.00 and the next day a nearby rancher deposited $500.00. By the end of the week my partner and I got some confidence in the bank and we both put in $50.00 each."

So — after years of talking, I've talked myself into real confidence in the future of Porcelain Enamel.

Note: An address before the 3rd annual War Conference General Session of the American Ceramic Society, April 1944.

The how and why

of sign advertising

By Ken M. Davee • DAVEE, KOEHNLEIN AND KEATING, CHICAGO, ILLINOIS

PART II • Uses of sign advertising

Exclusive feature finish

In part I of this series it was stated that little factual information on the advertising value of signs has been available. However, when beverage companies invest as much as 50 per cent of their total advertising budgets in signs; when oil companies follow suit with expenditures above a million dollars in single campaigns; and again when hundreds of thousands of dollars are allocated to sign advertising by the leading tire companies there can be little doubt of recognition of their value in these fields.

An oil company in 1939 spent two million dollars in their sign identification program. Another oil company in a single campaign spent some two and one-half to three million dollars on identification signs, the faces of which were porcelain enameled.

All of these companies and a multitude of others are showing more and more interest in signs as an advertising medium.

What jobs do these signs do, and what are the results worth to the advertiser? Since sign advertising has been notably successful for advertisers in several leading industries, isn't it logical to believe that other businesses can utilize signs much more profitably than they have in the past? Here are some of the answers to logical questions.

Identification signs

The identification job signs do is well known. The most obvious benefit of this type of signs was illustrated time and again in the research underlying these articles. One typical example is in the experience related by an executive of the Link-Belt Company. He was driving his new car across Iowa, (pre-war), hitting it up at a rapid clip, when the engine suddenly developed a frightening thumping. He was in trouble and he knew it, and he wanted the repair job done by an authorized dealer for his make of car.

As he drove slowly toward the next town he searched the roadside for a sign giving the name of the local dealer. He failed to find one, but as drive down the main thoroughfare of the town he spotted the familiar "authorized service" sign he was looking for.

This sign did nothing more than *identify*. The sale was consummated before that man ever saw the sign. It did nothing more, in his case, than guide him to the particular garage he sought. But it did the job well—better than any other advertising medium could do that particular job.

Too, many advertising men and other sign buyers think that identification is the only service a sign can render. Consequently, they are missing advertising value that more alert advertisers such as Coco-Cola, for instance, are using to their advantage. Let's examine some other uses.

How Woolworth's red store sign sells good will

Take the familiar red Woolworth store-front sign. At first glance it would seem that this sign does nothing more than identify the store. But that isn't the whole story, as a brief examination of Woolworth's business development will show you. They have advertised little. They have no extensive public relations organization to make you aware of their service. Yet such stores are pleasantly regarded and patronized from Coast to Coast. Some of the credit for this money-making good will certainly goes to the familiar signs across their storefronts.

Those signs do more than identify. They stand for the character of an institution. They serve as a constant reminder of pleasant shopping experience. They serve as familiar landmarks in a strange city. All of these cheerful reminders build good will and prestige for the organization.

The deep red porcelain enameled background with the gold letters are a combination that offers a feeling appropriate for the market-fair type of merchandise handled. The standard low price range is sufficient to furnish price appeal and the sign is left to do a *quality* job.

It is also interesting to note that the color *red* appeals particularly to women. And Woolworth's have known for years that women do the shopping.

These signs, and others like them, obviously do an institutional advertising job. The advertising service they render is as beneficial as any other institutional advertising, and the cost is insignificant. Paradoxically, it is just because sign advertising costs so little, however, that many sign advertisers have just recently begun to recognize it as one of the best buys among the advertising mediums.

Here is an important principle to remember in connection with 'point of sale" signs. A store may sell good

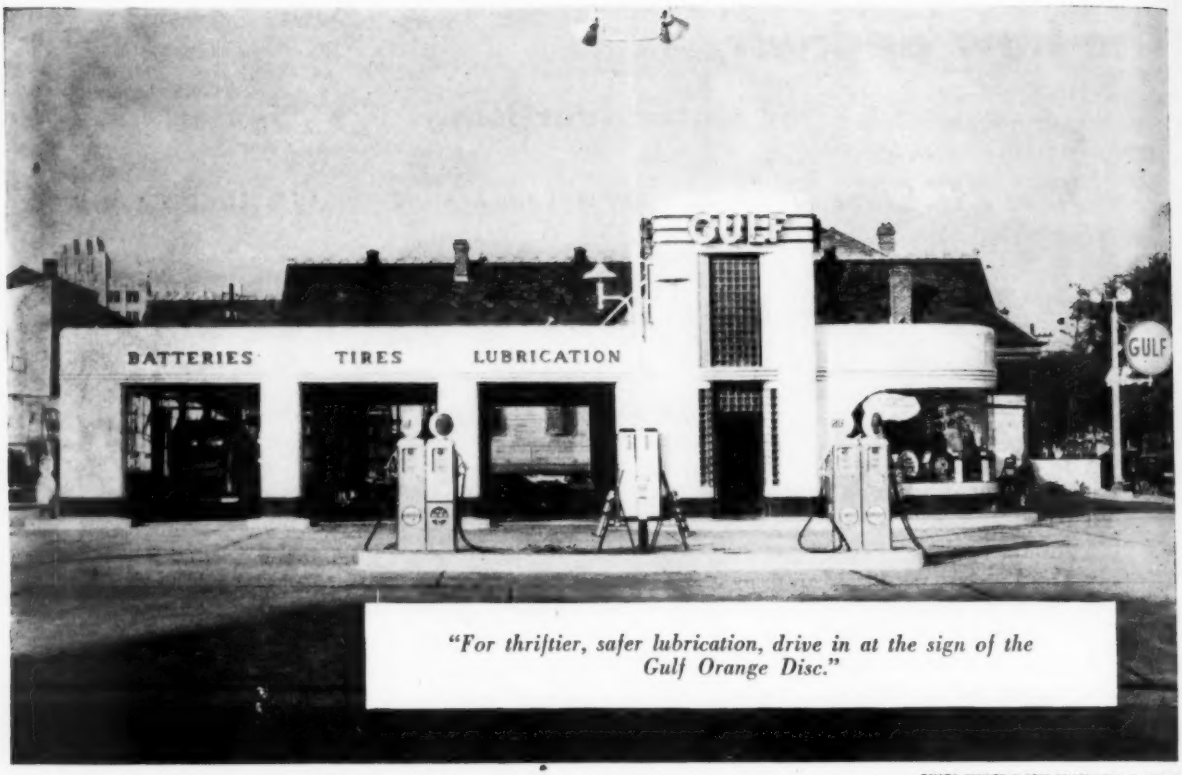


PHOTO COURTESY ERIE ENAMELING COMPANY

Not only are Gulf signs porcelain enameled, but in many instances, such as in this photograph, the entire filling station is of porcelain enameled steel.

merchandise, but offer a poor "front" in connection with its exterior display and identification sign, and fail to get new customers for this reason. A store may have poor quality merchandise and a good sign, and draw customers only once. Continued success requires a *good sign* plus the backing of *good* merchandise.

Supplementing other advertising

Another use of signs, which some advertisers recognize and value highly and others disregard entirely, is that of *supplementing and giving maximum effect to other forms of advertising.* Signs work cooperatively to produce the full value of other and more expensive advertising. The dollars-and-cents' value of this use of signs is convincingly domonstrated by the policy of one of the large bottlers.

It was suggested to this particular bottler that some measurement of the value of his signs—a sort of test—be made by removing all of them from his principal outlets in a small test city. He objected vigorously to that proposal. "You mean take down all my signs?" he asked in amazement. "I couldn't do that. No, indeed! That would absolutely ruin our sales there." That in itself is one of the most powerful endorsements of sign advertising that you can ask for.

"Besides," he continued, "we *know* what happens when our signs are not up—we don't sell any soft drinks. Our signs are so valuable that we devote half of our advertising expenditure to them—half of it, mind you. We will extend no cooperative advertising in other mediums to our licensed bottlers until they have an adequate coverage of signs in their territories. I know from bitter experience that a newspaper, magazine, or radio campaign can do its job effectively only when the signs are up."

Tell 'em where to buy

This man, because he can see the effects in his sales reports, knows the value of sign advertising as a supplementary medium to give effect to advertising in other media. Many advertisers, because they aren't in a business that permits such close supervision of sales, haven't learned that. They don't know how much they could increase the value of their other advertising by simply "telling 'em *where* to buy after they've told 'em *why*," as one battery company executive puts it.

Plenty of advertisers are recognizing the value of a close tie-up between dealer identification and other forms of advertising. That was apparent in much pre-war advertising. Some fortunate advertisers have held to this principle for a number of years.

One company that has profited in a big way through the closest possible tie-up between sign advertising and advertising in other media is the Gulf Refining Company. It has been their policy from the first—and that goes back to the early days of the automobile — to use Gulf's famous Orange Disc in *all* advertising the company does. It is an unwritten law in Gulf's advertising offices in Pittsburgh that no piece of advertising — magazine or newspaper ad, folder or poster will be finally approved unless it carries the Orange Disc. Thus, by correlating their sign

advertising with advertising in other media, they get the full effect of both.

This energetic promotion of the Orange Disc means sales—sales of gasoline, oil, and related products for Gulf. For the identification function of Gulf's advertising signs is much more productive of actual sales results than the term "identification" suggests.

Bell Telephone Company is another organization which has used this principle effectively.

Reminder advertising

Sign advertising, in addition to its identification job, is reminder advertising of the first order. At the corner drug store you pass on the way home, the Eastman Kodak sign reminds you to buy those films for the family camera.

Examples of this reminder value are countless, and every one of them means sales that might otherwise be lost, no matter how effective the advertising job in other media may be. The fact is that all over the country, every hour of the day and night, advertising signs are opening countless wallets and pocketbooks for purchases of a wide variety of products.

In normal times the clothing manufacturer is faced not only with the competition of others in his field, but also with that of the furniture maker, the automobile manufacturer, and every other business that sells to consumers. Those who are overlooking the reminder value of advertising signs are giving their competitor in every field a wide-open opportunity to create buying impulses and cash in on profitable sales.

Feature signs in magazine advertising

Many national advertisers recognize the supplementary pull of featuring their sign copy in their radio and printed advertising. In one issue of the Saturday Evening Post, 13 full pages of advertising carried illustrations of the advertisers' signs with copy similar to the following:

"Stop at the sign of friendlier service."

"Stop where you see the Texaco Star. That's a sure sign of . . ."

"Remember the man at the Red and White Bowes Sign is the one who can find tire trouble and fix it."

"For thrifteir, safer lubrication, drive in at the sign of the Gulf Orange Disc."

The value of the fractions of ad space devoted specifically to signs—*not the value of the entire advertisement*—in these 13 full pages of advertising totalled $6,973. Nearly seven thousand dollars worth of space in a single issue of the Saturday Evening Post was devoted to illustrations of dealers' signs. That indicates the value these front-rank advertisers place on sign advertising.

Of course, someone may say, "They picture the signs just to get on the good side of the dealer." Dealer approval is an extra value of such advertising, of course. But that's only one reason for featuring sign copy in space and radio advertising. The primary reason is the tie-in that makes it easy for consumers to buy, wherever they see the sign.

The bottler mentioned earlier knows the value of the tie-up between signs and other advertising in his business. If the signs aren't up, his other advertising can't do its

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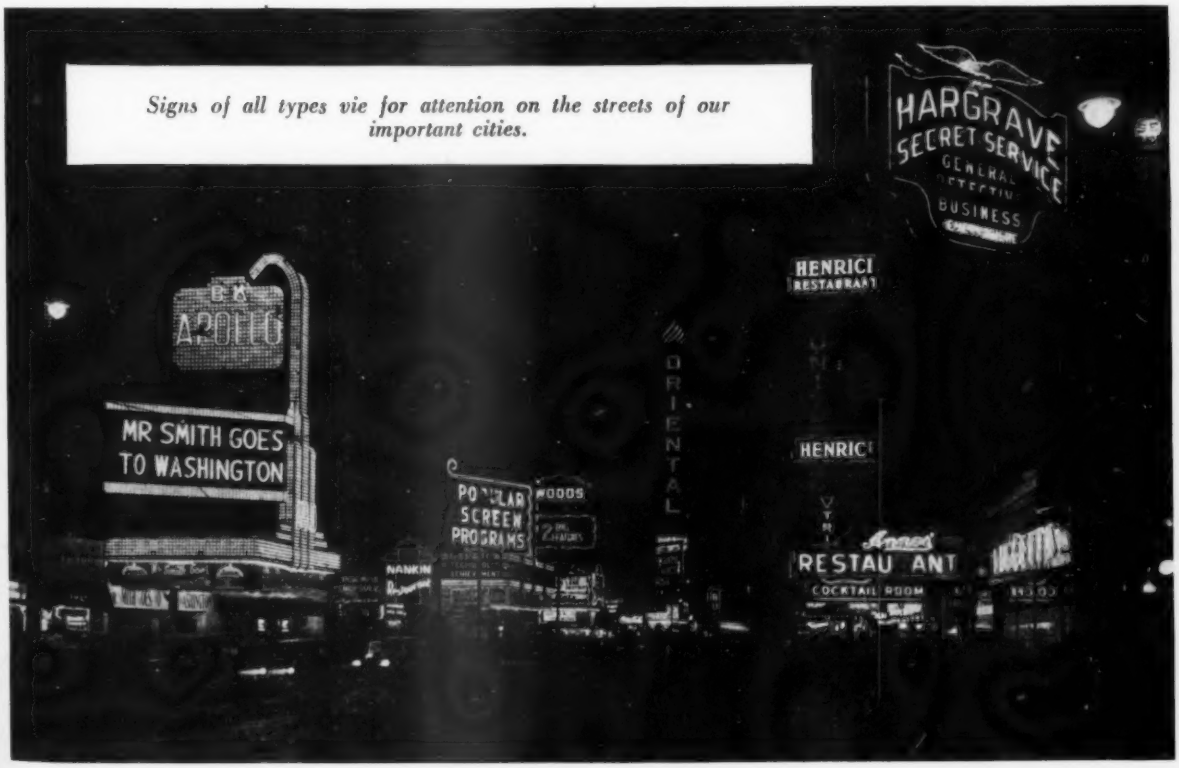

Signs of all types vie for attention on the streets of our important cities.

The application of low pH cleaning

to porcelain enameling

By B. F. Lewis • TECHNICAL DIRECTOR, NORTHWEST CHEMICAL CO., DETROIT, MICH.

WHEN we consider that the steel industry is made up of only three major divisions — production, fabrication, and finishing — it is apparent that the finishing or coating division is one of the nation's major industries. Within this latter group a further division must be indicated — the metal coating or plating industry and the non-metal coating industry, including all types of low temperature finishes and vitreous enamels.

This relationship is mentioned only as a point of departure, and from it we may go on to point out that all of the steelcoating industries have much in common. For one thing, they are rapidly emerging from the status of industrial arts, to the status of exact sciences. That is, the "know-how" of the skilled artisan is now supplemented by the "know-why" of men trained in chemistry and physics. From this combination we may expect to achieve a high standard of quality and cost control.

Another point of similarity between the various coating processes is at the very starting point — *surface preparation.* A clean surface is vital to the success of any coating process. On that point all are agreed. But what constitutes a clean surface, and how to assuredly produce it, day in and day out, has been a matter of great concern.

Certainly cleaning is important to the porcelain enameler; quite commonly the steel is subjected to more chemical operations in the pickle room than in applying the actual coatings. Each of these chemical operations is intended either to cleanse the surface of some previous contamination, or to alter the surface in preparation for a subsequent operation.

The problem of variable surfaces

The surface of steel "as received" for porcelain enameling may vary over a wide range of chemical and physical properties. Especially under present conditions, about the only specification on steel for vitreous enameling is that it be approximately of the gauge required by the fabricator of the part! This statement may seem facetious, yet many enamelers have been called on to process sheet steel of wide diversity of chemical and physical properties, with only the time-honored methods of cleaning and pickling available for use on all classes and conditions of ware.

As for the surface condition, the following factors may be present:

1. Rust from exposure to weather.
2. Rust due to reaction of lubricants, or so-called "protective" oils which break down chemically.
3. "Cold Work" or surface distortion from mill-finishing.
4. "Cold Work" from the action of dry abrasive wheels.
5. Greases and oils of animal origin.
6. Greases and oils of mineral origin.
7. Combinations of greases and pigments.
8. Residual iron compounds remaining from mill-pickling, so called "carbon smut."
9. Welding scale or oxide.
10. Charred grease incidental to welding.

These are not imaginary "bug-a-boos," but actual conditions which must be taken into consideration when prescribing a chemical process which will properly prepare the surface for the application of a porcelain enamel finish. The traditional treatment consists of soaking the ware first in a boiling solution of strong alkali, containing rosin soap, to remove surface grease and oil, followed by pickling in hot dilute acid to remove rust and oxide.

Relationship of cleaning to pickling

Unfortunately, the effectiveness of the acid pickle is directly predicated on the perfect functioning of the alkali degreasing bath. Since strongly alkaline baths have been found to be ineffective in removing certain of the compounds which are commonly present as contaminants on steel, it is apparent that acid pickling will be less than perfect, and the enamel coating will be defective.

In studying the reactions of these alkaline and acid treatments, it was discovered that those contaminating materials on the steel surface, which could not be removed by the conventional solutions, were readily removed by certain solutions in an intermedi-

B. F. Lewis,
the author, presents a paper.

FINISHFOTO

ate range of alkalinity. For example, certain types of drawing compound, or die lubricant, contain Emulsified DeGras, or sheep wool fat. In its emulsified form the compound is readily water-soluble. When allowed to *dry* on a steel surface, the emulsion reverts to its fatty-acid component and in the period of a few days may react with the steel, forming an organic iron compound. When steel ware with this film on its surface is cleaned in a bath having a pH of 13 or higher, the organic matter is "set" or "fixed" on the surface in such a manner that subsequent acid pickling fails to *wet* the surface, much less to *etch* it. That is, a "water-break," or water repellent area develops, and poor pickling results. This same film, which is soluble in neither alkali nor acid, will come off readily in a cleaning solution having a pH value of 7 or 8 in the presence of suitable solvents. This treatment is most effective when performed immediately *prior* to the conventional high pH bath.

The combined use of low pH and high pH cleaning baths makes it unnecessary to employ highly caustic components in either bath. This eliminates a hazard to workers in handling the cleaning chemicals.

When properly operated, the low-high combination will perform the following functions:

1. Remove, by direct solution, greases and oils of animal origin.
2. Remove, by emulsification, greases and oils of mineral origin.
3. Remove residual iron compounds remaining from mill pickling.
4. Remove light oxide films from welding or tempering.
5. Reduce red rust to a form more soluble in the acid pickle.
6. Activate areas of "cold-work" so that rapid pickling results.

From this it will be apparent that the low pH bath performs, in some measure, the functions of both alkali and acid, in a single solution. The application of this principle in the preparation of metal surfaces for electroplating has proven very valuable over a period of six years, and in view of the similarity of cleaning requirements in porcelain enameling, it is natural that the process has been successfully adapted to this industry and has been in use on particularly difficult and exacting jobs for several years.

Editor's Note:

Because of the increasing interest in the subject of metal cleaning and preparation for porcelain enameling and its acknowledged importance as a step in the complete porcelain enameling process, *Finish* will keep readers posted on all developments that seem worthy of editorial attention.

This article was especially prepared for *Finish* by the author, and is based on facts presented before the April meeting of the Chicago District Enamelers' Club.

Mr. Lewis is well qualified to speak on matters pertaining to metal cleaning and processing. His experience includes ten years in capacities ranging from control chemist to production superintendent in electroplating plants, three years as a consultant on metal processing and for eleven years he has been with his present connection where he is technical director and secretary-treasurer. His specialty is the investigation of surface reactions between metals and applied coatings.

No single operation in the pickle room can be studied intelligently without careful consideration of its relationship to the other preparatory operations, and to the ultimate finishing operations. Starting with the premise that a satisfactory enamel coating is predicated on a properly prepared surface, and in view of the fact that many variables exist on the surface of the steel "as received," it is unavoidable that the pickle room operations shall consist of a series of different chemical treatments, each having distinctly different characteristics, and each performing a different function, but performing that function in direct relationship to:

1. The "as received" condition of the steel. (We have seen that this condition is extremely variable.)
2. The other preparatory operations. (The chemical reactions in the various baths are interrelated.)
3. The desired surface condition for enameling. (Proper depth of etch, and proper degree of chemical activity.)

It is of considerable significance that the series of baths vary over a wide range of alkalinity and acidity. It is also significant that the baths are arranged in sequence, permitting treatment of the steel alternately in alkaline and acid baths. In a conventional setup, the sequence of treatments starts with a cleaner of high pH — 13.0 to 14.0; the pickle tank is, of course, strongly acid with a pH below 1.0; the nickel bath may vary between 2.0 and 6.0; and the neutralizer from 8 to 11.

Applying the low pH principle

In the low-high cleaning process, an additional preliminary treatment is added. This bath is operated in the pH range of 7 to 9, or very close to the neutral point, when we consider that the water supply to the pickle room usually has a pH between 6 and 7. With respect to cleaning, however, the low pH bath is anything but "neutral." On the contrary, it exhibits the characteristics of *both* alkaline and acid baths, but without evolution of hydrogen. That is, the bath is extremely effective in its reaction with surface oil and grease of all types, and in addition, will react with iron oxide, whether in the form of red rust, or the blue "temper colors." On longer immersion, further reaction will take place with the steel itself, in the same manner as an acid pickle. The resulting surface has been found to be suitable for enameling, and in the not too far distant future this treatment may, in some cases, eliminate the necessity for further acid pickling. At the present time, however, the low pH bath is used as a supplementary operation where two cleaning tanks are available; and its unique properties are utilized in improving the cleaning on difficult ware which is impossible to satisfactorily clean and pickle in the conventional sequence of operations.

XUM

Evaluating chemical cleaning

In using the phrase "improving the cleaning," we refer to a very specific standard of cleanliness. Not only must the ware be clean enough to retain an unbroken film of water on rinsing, but the surface must be immediately receptive to the action of the pickling acid. Properly prepared ware, when placed in the pickling acid, will react immediately with the formation on the steel surface of extremely small hydrogen bubbles, which disengage rapidly from the surface and are dispersed through the acid bath, giving the latter the appearance of an emulsion. This is in contrast to a poorly prepared surface which reacts slowly with the acid, forming large hydrogen bubbles which adhere tenaciously to the surface of the metal. Frequently a surface in this condition will show water-breaks on rinsing after the pickle, and it is necessary to re-cycle the ware through the cleaner and pickle to obtain a satisfactory etch. This repickling is eliminated when the low pH bath is used. Its "prepickling" action on the steel complements the action of both the high pH cleaner and the acid pickle, greatly reducing the processing time in both of these operations.

Reduction of Pickling time is of particular significance in connection with the problem of hydrogen absorption in pickling. Since the "prepickling" action of the low pH cleaner is accomplished substantially without the evolution of hydrogen, and since the time and temperature can both be reduced in the acid pickle, it is apparent that the possibility of hydrogen absorption into the ware will be greatly reduced. From a practical viewpoint, it is far better to prevent the development of a troublesome element, such as hydrogen, than to try to devise means of eliminating it in later operations.

The extensive work of C. A. Zapffe and C. E. Sims has emphasized the trouble-making potentialities of hydrogen in steel used for enameled products; but these investigators also state quite clearly that hydrogen is not to be considered the malefactor in all cases of defective porcelain enamel.

Characteristics of pickled surfaces

We have discussed briefly the unique properties of the low pH cleaning bath in removing difficult types of surface contamination; and we have pointed out its capacity to assume part of the function of the acid pickle, and to produce an improved surface condition for enameling. Our investigations in the cleaning end of pickle room operations naturally lead us into some of the intricacies of the subsequent operations — namely, pickling, nickeling, neutralizing, firing. Since much of our previous experience with a large variety of low pH and high pH cleaners, over a period of 10 or 12 years, has been in connection with the deposition of metals on metal bases, it was natural that, in a study of a process involving the deposition of a ceramic coating on a metal base, the question should arise as to what constitutes the ideally prepared surface. At some points the two processes (plating and enameling) are similar. At other points they are vastly different. In the case of metal plating, the surface must be free from any kind of non-metallic film. Even invisible films of metal oxides are intolerable. In the case of ceramics, however, considerable latitude is permitted, since a porcelain ground coat is capable of absorbing some oxides or other compounds of iron from the surface of the ware. Whether this practice of leaving pickling smut on the ware, to be absorbed by the ground coat, is in the interest of good quality is open to question. The answer to this question would be particularly desirable now in view of the current interest in white ground coats and single coat whites.

Pickling "smut"

Ideally, enameling iron will contain a very small percentage of the usual impurities and alloy elements such as carbon. Consequently, when such iron is pickled, there will be very little insoluble matter to remain as residual pickling smut. Actually the enameler may be called on to process many different kinds of steel sheet, without regard to its chemical composition and physical micro structure. In processing these steels, any increase in the carbon content will result in more residual smut on the surface after pickling. This is due to the fact that the carbon in the steel is in the form of Fe_3C, a compound of carbon and iron in the ratio of 168 parts, by weight of iron, to 12 parts of carbon. Iron carbide is insoluble in the conventional pickling acid, and remains on the surface in the ratio of 14 times as much pickling smut as the carbon content of the steel which dissolved in the pickling

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SEQUENCE →

Cleaner	Cleaner	Pickle	Nickel	Neutralizer
BATH #1	BATH #2	BATH #3	BATH #4	BATH #5
pH 7.5	pH 13.0	pH Below 1.0	pH 5.0	pH 11.0

TYPICAL pH RANGE IN PICKLE-ROOM OPERATIONS (RINSES OMITTED)

College interest in instruments

challenges responsibility of industry

By Earl M. Robinson • MGR. SERVICE DEPT., BROWN INSTRUMENT CO., PHILA., PA.

THE responsibilities of free enterprise in the postwar world will be multiplied many times. It is probable that private industry will grow or recede in strength according to the degree it recognizes its responsibilities, and how it disposes of them. The field of instrumentation offers a particularly outstanding example of this fact.

The growth of instrumentation, that precise science of determining and controlling temperatures, humidity, flow and other manufacturing and processing factors, has become so great in recent years that we are receiving a mounting volume of inquiries on the subject from the largest colleges of the country. The inquirers seek information for the purpose of introducing instrumentation as a part of college education. It is this trend that has called the attention of industry to the part it must play after the war.

The application of instrumentation in the industrial field has become so broad we have been compelled to advise several universities that the subject can not be incorporated in another course of study such as chemistry, mechanics, electronics, etc. Two very important obstacles bar the way to proper teaching of instrumentation as a tail to one or more courses, despite the good intentions, excellent staffs and programs of educators and educational institutions.

These obstacles are:

1. The time allowed for study of instrumentation, under present conditions, will not permit absorption of even a fraction of the necessary knowledge for practical application.
2. There are not enough well trained instructors available to meet the demand and to fill the increasing call from seats of higher learning. There will not be enough instructors for some time to come.

The first premise recalls the earlier emphasis for specialization in all fields. It is doubtful whether colleges are equipped or could be expected to be equipped now to provide at least one full semester to instrumentation instruction. The mechanics of instrumentation alone are already taking up a major part of the educational program which has been in operation in the Brown school for the past several years.

The second premise is taken as a matter of course. Instrumentation in the industrial field has increased enormously during the past two years. That it will continue to increase is generally accepted. Thus, the demands of industry are consuming most of the available men who might, or would be willing to become instructors. There are not enough of these men to meet educational requirements.

The whole problem of proper instruction in the instrument and other fields has been left in the lap of industry. Industry must make the most of the situation. I mean this in the full sense of "making the most of its responsibility" and, incidentally, the most of what it may be able to create now for its own good in free enterprise opportunities of the future.

The growing demand for education and practical instruction in the field of industrial instrumentation is being proved daily at the Brown Instrument Co. School. The school was started in 1935. The size of the first class was exactly two men. Since then it has grown to a point where we are turning out as many as 400 students a year. We have grown from a part-time, one-man instructor school to one requiring three full-time instructors.

The school classes have grown

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One corner of the practical application instructional class room at the Brown School in Philadelphia.

G. GIBSON — Frank has spent almost 16 years in enameling, the t 9½ of which have been with his present connection, Servel, Inc. ewar he was supt. of the company's porcelain enamel division. s war production job is general foreman of the wing division where concerns himself with perfection in building wings for the Re- blic Thunderbolt, Servel's major war contract.

F. R. PORTER — As ceramic engineer with Inland Steel Company, Frank is busy with developments for the improvement of enameling sheets and enameling processes. He became interested in porcelain enameling while with Edison G.E. and has as his aims the simplification and standardization of enameling processes. Enamelers will remember his early work with fine milling and reduced enamel thicknesses.

PEOPLE YOU KNOW

G. McGLAUGHLIN — Acting manager of Carnegie-Illinois Steel rporation's Sheet Sales Division, George has been doing sales rk for the U.S. Steel Subsidiaries since 1905. With one of his two as an officer in the U.S. Navy he wholeheartedly devotes his atten- n to speeding steel sheets on their way to manufacturers of vital r equipment.

H. V. KAEPPEL — As executive editor of Industrial Publications, "Herb" keeps in close contact with all ceramic problems. He has been with Industrial Publications since 1920. He was with Brick and Clay Record until Ceramic Industry was started in 1923, and then associated himself with the latter publication. He has visited and written about many enameling plants.

W. F. COPP — Warren (Pinky to his intimates) works on technical problems associated with steel for Wheeling Steel Corp. He has long been interested in problems concerning the porcelain enameling industry, and has, for a number of years, taken keen interest in the mutual problems of steel and enamel manufacture. Last, but not least, he is the father of a movie star daughter.

E. C. AYDELOTT — As standards division manager for Murra Corp., Elliott (Rod) is head over heels in war work. Prior to thi he was general superintendent over B-29 wing assembly. His peace time job for Murray was as a ceramic engineer on special assign ments connected with porcelain enameled products. Prior to hi work with Murray he was superintendent of Benjamin Electric' enameling division.

N OR SHOULD KNOW } Strictly Candid

R. R. DANIELSON — As director of research for the past fiftee years at Metal & Thermit Corporation, "R. R." (Danny) has bee closely associated with the porcelain enameling industry. He ha been very active in both the P.E.I. and the Eastern District Enameler Club, having been vice president in charge of technical committee for P.E.I.

C. M. ANDREWS — As ceramic engineer and superintendent of enameling "Cliff" has been in the business since his graduation from Illinois in 1934. Prewar he was supt. of enameling for McCray Refrigerator Co. He is now special research asst. professor of ceramic engineering at the U. of I., working on an Army Air Forces research project — "Ceramic Type Coatings for Exhaust Disposal Systems."

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Is there an IDEA here for YOU?

Whether your problem concerns the manufacture of electric irons, space heaters or some other low-priority, home-front equipment, Ferro's new *One-burn Color Coats* may help you to a quick and complete solution.

Light in weight, this handsome new Porcelain Enamel finish permits the use of lighter-gauge metal for many parts. It conserves man-hours, too, being applied quickly and economically.

Highly resistant to heat, impact and wear, Ferro's new One-burn Color Coats are available in several shades of blue, green, brown and gray. All may be dipped or sprayed on, then fired at approximately 1500 degrees Fahrenheit.

But, let us tell you more about this useful new wartime finish and how it can be successfully applied to one or more of your products.

New! FERRO One-burn Color Coats

FERRO ENAMEL CORPORATION

4150 EAST 56 STREET CLEVELAND 5, OHIO

Steel released for fluorescent reflectors

Finish receives the good news that steel has been released for the production of fluorescent lighting fixtures. W.P.B. Order L-78 was amended on April 3, removing weight restrictions on steel for use on fluorescent fixtures, but continued the prohibition of steel louvres, closed ends, etc. A new amendment, dated April 13, to become effective April 21, 1944, removes the balance of these restrictions so that steel may again be used in the production of this item so important to the porcelain enameling industry.

One possible bottleneck in connection with projected production may result from the current situation in regard to transformer production — but we are hopeful that much valuable production in this field may accrue to porcelain enameling plants.

New Chicago Vit vice president

Burton T. Sweely, formerly director of research, has been elected vice president in charge of research of the Chicago Vitreous Enamel Product Company, Cicero, Illinois, according to recent announcement by William Hogenson, president.

"Burt" Sweely joined the staff of Chicago Vitreous in 1932 as director of research and manager of frit production. It is pointed out by the company that the period covered by Mr. Sweely's service has been one of extreme importance in connection with enamel development work.

The new vice president was born May 31, 1886 in Mitchell, South Dakota. He has a B.S. degree in ceramics from Iowa State College and is a member of Tau Beta Pi, Sigma Alpha Epsilon, and an honorary member of Keramos.

Prior to his service at Chicago Vit, he was general factory manager for the Baltimore Enamel and Novelty Company, Baltimore; ceramic engineer in charge of enamel manufacture for the Coonley Manufacturing Company, Cicero; and research ceramic engineer for Western Electric Company, Chicago.

Mr. Sweely is a member and Charter Fellow of the American Ceramic Society, a member of the Institute of Ceramic Engineers, and active in the work of the Porcelain Enamel Institute, having headed several committees set up by the Institute to work on the practical and technical aspects of enamels.

It was reported that Mr. T. F. Lance has been named president of the Dortch Stove Works, Franklin, Tenn. Other new officers of the company include B. M. Kinney, general manager; G. O. Stanley, vice president; and D. O. Bailey, treasurer.

P. E. I. Annual Meeting

Announcement comes from the Washington office of the Porcelain Enamel Institute that the P.E.I. Annual Meeting will be held on Tuesday, June 6, at the Cleveland Hotel, Cleveland, Ohio.

Architectural conference

According to Charles S. Pearce, managing director of the P.E.I., the Institute will sponsor an architectural conference on Wednesday, June 7, at the Hotel Cleveland, Cleveland, Ohio, at which a "bang-up" program of headline speakers is promised.

Richard H. Turk given NAM Committee post

Richard H. Turk, executive vice-president of the Pemco Corporation, has been named a member of the National Association of Manufacturers Committee on Veterans Employment Problems, Robert Gaylord, NAM president, announced recently.

The committee includes fifty industrial executives, with Harry L. Derby, president of the American Cyanamid and Chemical Corporation, of New York City, as chairman.

American Gas Machine Receives Governor's Award

The Governor's Industrial Safety Award was tendered to the American Gas Machine Company, Albert Lea, Minnesota, at a dinner held recently in Minneapolis. C. E. Rogge, chairman of the plant safety committee, and E. H. Danielson, factory superintendent, accepted the safety flag, presented by Governor Edward J. Thye, for the company.

A remarkable record has been achieved by the company in its forty-eight years of operation without a single fatal accident. Army and Navy officials are said to have been most favorably impressed by the record of the company when considering them for receipt of the "E" award which they received earlier this year.

Another point that will be of no little interest to industrial concerns is the fact that American Gas Machine has, over a period of years,

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won a reduction of 19% in the insurance rates applicable to workmen's compensation. Their present record is particularly outstanding because factory employment has more than doubled as a result of wartime activity.

Credit for this record goes to proper lighting and complete use of safety devices; an active safety committee composed of Mildred Morehouse, Cora Williamson, A. F. Wohlhuter, C. E. Rogge and Elmer Nelson; safety education by company foremen; and genuine interest and alertness on the part of each employee.

New Bendix home service director

Edwina Nolan has been appointed home service director for Bendix Home Appliances, Inc., South Bend, Indiana, it was announced by J. S. Sayre, president. She will head home service activities in the newly formed Bendix Home Laundry Institute, which the company refers to as the first organization of its kind in the washing machine industry.

According to Mr. Sayre, "Miss Nolan and her staff will prepare laundry demonstrations for department stores, public utilities and dealers — will work closely with the manufacturers of laundry accessory items — will cooperate with universities and colleges, and with the various magazine editorial people."

"Testing and research will be conducted on all phases of home laundry problems and factual data will be gathered not only for the housewife but for the salesman as well."

Miss Nolan comes from Connecticut where she was a member of the state nutrition committee, one of the original members of the women's advisory committee of the War Advertising Council and one of the original 10 women selected to serve on the salvage committee of the War Production Board.

Ed Goetz in the Service

E. W. (Ed) Goetz, known to his friends in the enameling industry as managing editor of Better Enamel-

ing magazine, joined the Armed Forces on February 4, 1944. Until recently he was stationed at Jefferson Barracks where he was assigned to duties as personnel technician in the offices of the Post Commander.

News has just reached *finish* that Ed was stricken with rheumatic fever and is now confined to Scott Field hospital. Thinking many of his friends may want to drop him a note we are including his proper address:

Pvt. E. W. Goetz, 36786560
A.A.F. Regional Hospital No. 1
Ward B-5
Scott Field, Illinois

Stove mfrs. mid-year meeting

The Mid Year Meeting of the Institute of Cooking and Heating Appliance Manufacturers has been scheduled for the Netherlands Plaza Hotel, Cincinnati, Ohio, June 7, 8 and 9.

Westinghouse lamp sales manager

Appointment of Russell E. Ebersole as lamp sales manager of the Westinghouse Lamp Division was an-

nounced by Ralph C. Stuart, manager.

Born in Nyack, N.Y., Mr. Ebersole went to Westinghouse in 1922 as a lamp salesman in the New York District. In 1932 he was made manager of metropolitan New York sales. In July, 1942, he was appointed manager of the Middle Western District, with headquarters in Chicago.

Ebersole is a director of the Chicago Lighting Institute; a member of the Electrical Association and Electric Club, both of Chicago, and the Electrical Associates Club of New York.

Goldberg a Marine Engineer

From the enameling plant of a washing machine manufacturer (Altorfer Bros., Peoria, Ill.) to work in the capacity of a Marine Engineer for the U. S. Navy is quite a jump according to Leo Goldberg, who is now stationed in the Office of the Supervisor of Shipbuilding, Defoe Shipbuilding Co., Bay City, Michigan. As is true of most of those whom we have contacted who are in essential war activity in fields foreign to enameling, Leo indicates he still maintains a strong interest in the activity of the industry and its individual members.

Steel is "king" in the metals group

In a recent talk before the 1944 War Conference of the American Gas

Association, Mr. Lawrence E. Biemiller, assistant manager of the Industrial Fuel Department, Consolidated Gas Electric Light & Power Company of Baltimore, Maryland, had this to say about basic materials —both metallic and non-metallic:

"Up to date, steel has continued to maintain its position as the leading engineering material and it is to be expected that it will remain in this position even though some present steel uses are replaced by other materials. It is estimated that this Country now has capacity to produce 112,000,000 tons of basic metallics and non-metallics. The relative productive capacities of different industries are as follows:

Steel	85%
Glass	8%
Lead and Zinc	1.8%
Copper	1.3%
Aluminum & Magnesium	1.3%
Plywood	Less than 1%
Synthetic Rubber	Less than 1%
Plastics	Less than ½%

"We may expect increasing competition from these various other materials for the steel market. However, we may also expect that there will be a fairly ample market for all of these materials if the employment of tomorrow and the economic activity of tomorrow is that which most people believe possible and necessary after this war.

"The Steel Industry now has a capacity to produce about 96,000,000 tons of ingots annually. Compared with this, the capacity for aluminum is 1,200,000 tons and the capacity for magnesium 300,000 tons per year. This holds true despite the fact that the most spectacular expansion of facilities in recent years has been in the Light Metals Industry.

Importance of the food industry to appliance manufacturers

Clarence Birdseye of Gloucester, Mass., gives us a picture of food consumption which should be of interest to manufacturers of household appliances responsible for the cooking and preservation of perishable foods. Following is quoted from an address before the American Gas Association's recent War Conference in Rochester, New York:

"Very few people realize the tremendous size and potentialities of the perishable food business. Exact statistics are lacking, but apparently food consumption in the United States was approximately fifteen billion dollars in 1932 and twenty-one billion dollars in 1942. The projected figure for 1946 is truly staggering—thirty-four billion dollars! On the average, perishables represent about 75 per cent of total food consumption in the United States; so that sales of perishable foods alone were about ten billion dollars in 1932, fifteen billion in 1940, and may be expected to reach twenty-four billion by 1946."

Chicago Vit V. P. receives Tribune "War Workers Award"

Carl G. Strandlund, vice president and general manager of Chicago Vitreous Enamel Product Co., has been awarded the Chicago Tribune's "War Workers Award" for an improved method for heat treating armor plate for tanks and other weapons.

The report of the award indicates that his achievement has saved thousands of hours in war plants, thousands of dollars, and is said to have greatly improved the quality of armor plate itself.

Presentation of the award — symbolized by a diamond studded gold Victory pin — was made on Wednesday, April 26, by Major S. C. Massari of the Chicago Ordnance District. The presentation ceremony, in which Mr. Strandlund and other company executives — William Hogenson and E. Hogenson — participated, was broadcast over radio station WGN.

Many companies in the enameling field are acquainted with the procedures normally used for heat treating, quenching and straightening of armor plate on conventional presses or press brakes. Under the "Strandlund method," which won for this executive the Tribune award, the armor plate slabs are treated in the regular way and then carried from the annealing furnaces, on transfer cars, to a large 2500 ton press.

Strandlund designed the dies used in this press. They resemble huge "waffle irons," containing 7.200 holes through which water is ejected. When the press locks a slab of red-hot armor plate against the die a flow of water is ejected from the holes, which quickly quenches the plate. The 2,500 tons of pressure prevents distortion, and the slab emerges from the press flat.

Man hours saved

According to Philip Hampson, who reported the award in the Tribune, "Under the old method it required about 15 man hours to complete the heat treating of an armor plate slab. Under the Strandlund method it takes 6 or 7 minutes. One press using the Strandlund method does the work of about 25 cold straightening presses.

"It is estimated that at the Cicero plant alone — 1,000,000 man hours and 500,000 machine hours were saved in 1943. . . . It is estimated that about 9c a pound saving has been made."

A gamble that paid

The Strandlund method is said to have made possible radical improvements in some of the nation's most advanced types of fighter tanks.

Chicago Vitreous reports that "Mr. Strandlund got his idea for his improved method after observing the slow and cumbersome processes formerly necessary to control distortion of annealed plates. He persuaded his superiors, Messrs. W. and E. Hogenson, to take a "$200,000 gamble" on the building of equipment which worked the very first time it was used."

XUM

SAVE A PLACE FOR TH

CHICAGO VIT. MAN

When you are considering the problems of reconversion, take advantage of the specialized knowledge of **CHICAGO VIT.** men.

CHICAGO VIT. men are working even now with scores of firms—helping them plan their post-war products or assisting them in laying out their step-by-step plan for plant reconversion. These are the firms who will have the jump on their competitors, come the armistice.

CHICAGO VIT. men are far more than specialists in porcelain enamel finishes. They are also practical plant men who know equipment, application and firing, operating methods and short-cuts to economical efficiency. You can have this wealth of experience focused on *your* problems for the asking.

CHICAGO VITREOUS ENAMEL PRODUCT CO.

CICERO, ILLINOIS

Makers of Fine Porcelain Enamels

Nat'l. electric sign assn. directors meet to discuss activities

Outline of Association plans

THE Board of Directors and Committee Chairmen of the National Electric Sign Association met at the Palmer House, in Chicago, on April 23 to complete final arrangements for getting a full program of activities underway. Since its organization on January 11, 1944, the Association's standing committees have done considerable research work on Labor Relations, Standardization and Legislative matters. With all the preliminary work completed the various committee chairmen presented detail reports of the activities they proposed to carry on.

Under the direction of H. B. Link, of The Bellows Company, Akron, Ohio, the Labor Relations committee gathered data on wage scales and working conditions from all over the country. This information showed a wide variance in working arrangements in force throughout the industry. To correct this unequal condition, plans were formulated for the committee to draw up a practical uniform agreement which would be satisfactory to both the unions and the sign companies.

R. L. Kester, Jr., of the Federal Electric Company, Chicago, reported that his Legislative Committee had set up means of following national and state legislation concerning the Electric Sign Industry. The committee is also collecting copies of local ordinances in order to develop a proposed uniform sign ordinance.

Lewis Carroll, The Lackner Company, Cincinnati, Ohio, chairman of the Standards Committee, presented a complete outline for activities covering all phases of this subject. The program was divided into four parts and President John Aull appointed subcommittees to develop a set of standards for each section.

Subcommittees include transformer section; glass section; electrical insulation, porcelain and glass products section; and maintenance, repair, service and guarantee section. Members of the latter two sections are:

Electrical insulation, porcelain and glass products

C. G. Fuller, Chairman, Universal Clay Products, Sandusky
W. A. Barrows, W. A. Barrows Porcelain Enamel Co., Cincinnati
O. A. Dorsett, Knox Porcelain Corporation, Knoxville
R. N. Lambert, Corning Glass Works, Corning
J. G. Loy, Porcelain Products Company, Findlay

Maintenance, repair, service and guarantee

E. D. Lamdin, Chairman, Walker & Company, Detroit
G. C. Kirn, Jr., G. C. Kirn Advertising Sign Company, St. Louis
J. Ferring, Federal Brilliant Company, St. Louis
L. Oliver, Cook Sign Co., Fargo
A. S. Thomas, White Way Electric Sign & Maintenance, Chicago

Association program

N.E.S.A. consists of a group of thirty-nine charter members, including electric sign manufacturers and their suppliers.

A well-rounded program has been set up to cope with today's problems and develop activities to meet the challenge of post war sign business. Activities on the following subjects will be undertaken as circumstances dictate:

1. To protect, defend and advance both national and local commercial and legal rights and privileges of the electric sign industry; and to appear for the members of the association before, and to cooperate with, legislative committees, governmental departments and agencies and other bodies in regard to matters affecting the electric sign industry.
2. To band together to conceive and inaugurate progressive self-educational programs and policies designed to develop new opportunities for the sale, manufacture and maintenance of electric signs; and to assume leadership and responsibility for extending and expanding these programs and policies for mutual benefit, for the benefit of customers, and for the benefit of the electric sign industry and the public at large.
3. To direct efforts toward a more efficient and practical standardization of materials and production methods so that progressively better quality electric signs can be manufactured and maintained with increasing efficiency by the members of the Association.
4. To conduct continuous research in new materials and production methods, and to provide members with full information on these developments.
5. To establish and maintain employer-employee relations of high moral character for the collective benefit of advertisers who will depend on the responsibility of the members of the Association to provide such services.
6. To work toward uniformly efficient and equitable maintenance and manufacturing services for the benefit of advertisers who will depend on the responsibility of the members of the Association to provide such services.
7. To establish cordial and cooperative relations with other related organizations in matters and activities of mutual interest and benefit.
8. To record, and make readily accessible, all available local sign ordinances for reference purposes; and to work progressively toward the improvement and standardization of local sign ordinances, wherever and whenever the opportunity arises.
9. To accept the responsibilities of sound and ethical business practices implied in the collective aims of this Association, and to apply these practices in the conduct of business of each individual member.

Association officers and directors

John Aull, president, Swanson-Nunn Electric Co., Evansville, Indiana.

Harry Parker, vice president, Flashtric Sign Works, Chicago, Illinois.

Geo. C. Kirn, Jr., secretary-treasurer, G. C. Kirn Adv. Sign Co., St. Louis, Missouri.

Directors are:

Ben H. Adler, Adler Silhouette Letter Co., Chicago, Illinois.

H. B. Link, The Bellows Company, Akron, Ohio.

R. M. Foster, Macon Neon Sign Co., Macon, Georgia.

E. D. Lamdin, Walker & Co., Detroit, Michigan.

J. B. McMath, Texlite, Inc., Dallas, Texas.

Loren Oliver, Cook Sign Co., Fargo, North Dakota.

L. A. Rice, Electrical Products Corp., Los Angeles, California.

D. R. Swormstedt, Signs of the Times Pub. Co., Cincinnati, Ohio.

Maurice R. Ely, Executive Secretary, will direct the activities of the Association. Mr. Ely spent seventeen years with the Electric Association, in Chicago, and was Secretary-Treasurer of the Electrical Maintenance Engineers and the West Suburban Electric League. For the past year he was a lighting sales engineer with Sylvania Electric Products, Inc.

Chicago enamelers' club third wartime meeting

New officers elected

THE third war-time meeting of the Chicago District Enamelers' Club was held at the Field Building, LaSalle and Adams Streets, Chicago, Saturday, April 22. Sixty-three were in attendance to hear an excellent program of papers and reports.

Elect new officers

The annual election of officers resulted in the election of E. E. Howe, ceramic engineer, Chicago Vitreous Enamel Product Co., formerly vice president of the club, as president for the ensuing year; W. W. Higgins, director of ceramic research, A. O. Smith Corporation, Milwaukee, vice president; and Dana Chase, editor of *finish*, secretary and treasurer. The officers elected were those selected by the nominating committee headed by G. G. Hansen, Chicago office of Consolidated Feldspar Corporation.

Frank Hodek, Jr., retiring secretary-treasurer, was presented with an attractive monogrammed brief case as a slight token of appreciation by the Club for his eighteen years of service in this office. Frank took over the job of secretary-treasurer on January 7, 1926, when the Club was first organized, and has been the only man holding this office to date.

In making the presentation President Shands said, "You have served us, and served us nobly, during good times and bad."

Mr. Hodek explained it wasn't because of any lack of interest in the Club, or the enameling industry as a whole, that he had asked for relief from the position. "Eighteen years is a long time to serve, and it is a good thing to change around."

Two Charter Members of the Club were present: A. L. Vodicka, president and general manager, Aetna Porcelain Enameling Co., Chicago, and Bruce Wagner, Chicago representative for Titanium Alloy Manufacturing Co.

One item of business was the suggestion by Mr. Howe and W. J. Plankenhorn, ceramic engineer, Federal Electric Co., program chairman, that the possibility of participating in panel discussions such as have been held under the auspices of the W.P.B. and Chicago Technical Society be investigated.

Following is a brief digest of the program:

Metal preparation

An interesting paper on low pH cleaning and its relationship to porcelain enameling was presented by B. F. Lewis, Northwest Chemical Company, Detroit, Michigan *1.

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At the speakers' table are, left to right: P. G. Andres; B. F. Lewis; J. J. Svec; E. H. Shands, retiring president; and F. E. Hodek, Jr.

That there is much interest in this development pertaining to the important operation of metal cleaning was evidenced by the discussion of what Northwest Chemical Company terms "Lo-Hi" (low pH and high pH) cleaning, following Mr. Lewis' presentation. The talk was illustrated by

This photograph shows a part of the group that attended the third wartime meeting.

FINISHFOTO

full-color slides showing test samples.

A few of the points covered in the discussion which followed produced the following answers to discussion questions:

It may be possible to discontinue nickel baths IF undesirable characteristics of "smudge" are eliminated.

Low pH baths last for shorter periods than conventional alkali cleaners as the organic acids are subject to oxidation. Quantities of materials used, however, are in proportion.

High pH following low pH assures complete "wetability."

E. E. Howe, new club president.

Electronics in industry

The next feature of the program was an interesting talk by Professor P. G. Andres, Illinois Institute of Technology, on "Highlights on Electronics in Industry."

Prof. Andres traced the history of this interesting phase of our present industry activity from the early application of "The Edison Effect" through the developments of three element vacuum tubes, such as used for long distance telephony; the work of Armstrong at Columbia University in the early 20's, and Frank Conrad of K.D.K.A., Pittsburgh. He covered the application of induction heating and di-electric heating and visualized the possibility of a change from our present methods of heating "from the outside", even in the home kitchen, to di-electric methods of "heating from the inside."

F. E. Hodek, Jr. served for eighteen years as secretary-treasurer.

He explained in a non-technical and interesting manner the application of rectifier and amplifier tubes and latest control devices—how these are applied to such a variety of work as the dimming of theatre lighting to control of welding operations. He then covered the application of photo-electric cells to a wide variety of work, ranging from elevator controls to many and varying inspection and control applications in industry. Fluorescent lighting was also covered. The only related subject not treated (for obvious reasons) was radar.

The third feature on the program was a discussion by J. J. Svec, of Industrial Publications, in which he gave pertinent details on the Enamel Division papers *2 presented at the recent American Ceramic Society Convention in Pittsburgh.

W. W. Higgins, new vice president.

*1 *An article adapted from Mr. Lewis' paper appears on page 20 of this issue of* finish.

*2 *See April* finish, *page 29 for abstracts of all Enamel Division papers.*

Geo. D. Roper Corp. receives third "E" award

For the third time the Geo. D. Roper Corporation, Rockford, Illinois has been signally honored by the Army and Navy for continued high standards of war production.

On March 27, 1943, the Roper organization received the original Army-Navy Production Award. This was followed by the first White Star awarded September 25, 1943, and now by the second White Star award, notice of which has just been received.

Peacetime manufacturer of Roper gas ranges and Roper pumps for all purposes, since the start of the war the Roper organization has concentrated its manufacturing activities upon 75 MM and 3″ projectiles, aircraft landing gear, pumps for almost every type of naval vessel afloat, pumps for the Maritime Commission, foundry castings for many essential war purposes and other important war products.

Since January 1, 1944, Roper has also manufactured a gas range built under authority of the War Production board and sold in step with the O.P.A. stove rationing program.

Apologies to Mr. Coin

Our apologies to Ray Coin, the genial president of Ingram-Richardson Mfg. Company, Frankfort, Indiana, for putting a "Vice" in front of his correct title in the feature, "People You Know." "V" is a good letter in its wartime meaning, but not so appropriate when incorrectly preceding the title "President."

New manual on metal preparation for porcelain enameling

AT A joint meeting of the Frit and Porcelain Enameling Sheet Manufacturers held April 12 at Hotel William Penn, Pittsburgh, a manual on the preparation of metal for porcelain enameling was aproved for publication. The book includes instructions for treatment of the base metal immediately following fabrication and also just before porcelain enamel is applied. There is a short discussion of drawing compounds, the remainder of the text being devoted to the processes by which a clean metal surface can best be produced.

The men who collaborated in drawing up the specifications are listed as follows:

B. T. Sweely, director of research, Chicago Vitreous Enamel Product Co.

G. H. McIntyre, director of research, Ferro Enamel Corporation.

H. L. Cook, research engineer, The O. Hommel Company.

C. P. Scripture, vice president, Ingram-Richardson Mfg. Co. of Indiana.

H. G. Wolfram, vice president, Pemco Corporation.

H. L. Moody, secretary of the comm., 19 W. 44th St., New York 18, N. Y.

The recommendations thus formulated have further been reviewed, edited and approved by the porcelain enameling sheet manufacturers, fifteen in number, who, jointly with the frit manufacturers, now sponsor the manual as issued.

Not only pickling procedure but control of pickling solutions is discussed. In very simple language, the authors outline the preparation of standard pickling solutions and of the reagents by which the strength of solutions in use can be absolutely controlled. The superintendent of a pickling room, by following the advice given, can easily standardize a set of procedures by which rework, rejection, and scrap losses are reduced and manufacturing costs lowered accordingly. It is not maintained that the instructions offered by the committee are the only ones that can be followed successfully, at all points, but it is maintained that any porcelain enameler who does not have highly effective controls in the preparation of his metal would do well to adopt those recommended in the new manual.

The book will be mailed from the New York office of the committee to an extensive list of manufacturers and to others on request.

Publicity on enameled kitchenware

The Enameled Utensil Manufacturers Council is currently releasing publicity information of an editorial nature to newspapers and periodicals which should reflect benefit not only to the holloware manufacturers but to other porcelain enamelers as well.

In a recent release, sent to daily newspapers for the Council by the Lawrence H. Selz Organization, Chicago, in which the accompanying photograph is offered for illustrative purposes, information is given on the proper method of cooking fresh vegetables. In connection with the utensils to be used the article says:

"The utensils in which vegetables are cooked also play an important part in their palatability. Some pots and pans seem to "rob" vegetables of their attractive color and flavor more than others. To assure strict sanitation, porcelain enameled ware is advised. The enamel finish is non-porous and non-absorbent so that food juices and elements cannot be 'soaked up' by the pan. Consequently, none of the vitamins and wholesome flavor is lost when vegetables are cooked in enameled ware."

With regard to efficiency of enameled ware, the article continues:

"Another reason why porcelain enameled utensils are favored for vegetables is that enameled ware conducts and retains heat efficiently, thereby assuring even cooking. Because enameled utensils do hold heat efficiently, they require less fuel. The flame may be lowered as soon as the contents of the pan have reached the boiling point. To control the temperature even more, a double boiler may be used for some vegetables."

News from Washington

O. P. A. announcement for plumbing ware manufacturers

Sellers of copper ball cocks for plumbing fixtures produced following revision of a War Production Board limitation order will use the same ceiling price to each class of customer that was in effect when these items were last manufactured in midsummer of 1942, the Office of Price Administration announced recently.

Manufacturers' prices for these plumbing articles were first established under the General Maximum Price Regulation, and later retained under Maximum Price Regulation No. 188. Other sellers' ceiling prices are established under the General Maximum Price Regulation. Both these regulations use March 1942 as a base price period.

The WPB action which permits limited production of the copper ball cocks (Amendment to Schedule V of Order L-42) became effective April 4, 1944.

Industry urged to buy coal now

Industrial consumers of bituminous coal, particularly war plants, have been urged by Donald M. Nelson, Chairman of the War Production Board, to buy and store maximum amounts of coal during the coming months in anticipation of a serious deficit in supply for the twelve months starting April 1, 1944.

In an open letter to coal consumers, Mr. Nelson pointed out that in 1941, '42 and '43 when the government had requested summer coal buying, an adequate mine supply of bituminous coal was in prospect. Now the position is far more serious. The Solid Fuels Administration for War forecasts a deficit for the coming year between coal production and requirements of at least 25,000,000 tons, perhaps even 45,000,000 tons if manpower in the mines is seriously diminished by draft requirements.

The letter specifically warned war plants engaged in essential production that they could not expect preference in obtaining coal next winter and that it was their obligation to store large amounts of coal this summer in order to assure full production throughout the year. Mr. Nelson said that it was the responsibility of WPB to maintain full war production and asked the war plants to buy and store, to the utmost limits, coal of all grades, including fine sizes of anthracite, coal from strip mines, and the lower quality of coal from deep mines.

Blanket export licenses for Latin American countries

The Foreign Economic Administration recently announced a list of commodities which may now be exported, under a single "blanket" license, to more than one consignee in any Latin American country which does not require Import Recommendations for these commodities. It has previously been necessary for exporters to submit separate applications for licenses to export to each consignee.

The new procedure, which is effective immediately, is known as the BLT or "blanket license" provision, and will minimize paper work for U. S. exporters. Details of the general procedure are described in FEA Current Export Bulletin No. 153.

Lists of the commodities which may now be exported under blanket license are in FEA Bulletin No. 158. Included in the products listed are abrasives, electrical machinery and apparatus, iron and steel (cutlery, nails and bolts, stoves, tools, miscellaneous), etc.

The commodities for which import requirements have been waived vary for different countries.

"F-22" refrigerant gas restricted

The War Production Board has acted to sharply restrict deliveries of the refrigerant gas "F-22," particularly for use in any system of comfort air conditioning and any installation for storing or dispensing carbonated or malt beverages.

Says W.P.B., " 'F-22' gas is a comparatively new refrigerant and has, to date, been utilized mainly for low temperature experimental work, such as for testing flying clothes and instruments under simulated stratospheric conditions and for the shrinking of metals. The present inventory of 'F-22' is deemed insufficient to permit uncontrolled withdrawals.

"Expectation that owners of refrigerating and air conditioning systems that have been prohibited from obtaining delivery of "F-12" gas might attempt to substitute "F-22", heretofore available without control, led to the issuance of this revision of Conservation Order M-28. With the revision the order will be known as M-28-a."

Even with the imposition of these new restrictions on deliveries of "F-22," WPB estimates that inventories of this refrigerant gas, at the present rate of authorized withdrawals, will drop to a critical low about July 1. Assurances were given that with these restrictions in operation, an adequate supply of "F-22" will be available for those systems designed specifically to use this gas for war production purposes.

W. P. B. concerned about appliance repair services

Repair services for many domestic appliances are being greatly handicapped, the War Production Board reports, because many repair shops are not taking advantage of a WPB regulation designed especially to aid them in more readily obtaining parts and materials for their operations. These items of civilian equipment include *refrigerators, washing machines* and other *electrical appliances*, as well as *stoves, automatic heating plants* and *plumbing*.

Controlled Materials Plan Regulation No. 9-A provides that these shops may purchase in each calendar quarter up to twenty tons of carbon and alloy steel, 500 pounds of copper base alloy and brass mill and foundry products, and 200 pounds of aluminum in specified forms and shapes. In addition, electrical contractors, electricians, and repairmen of electrical appliances and household refrigerators may purchase in a calendar quarter up to $150 of copper wire, or one-eighth of what they used in making repairs during 1941. Under this

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From the Editor's mail . . .

Scott Bros., Ltd., Christchurch, New Zealand.

"An excellent production. Our preference is for technical articles and descriptions of plants."

Owen Evans, Works Manager.

American Rolling Mill Company, Ashland, Ky.

"Will be anxiously looking forward to each copy. 'Finish' will fill a long felt want."

Hugh B. Grant, Mill Representative, Servicing Enameling Plants.

Benjamin Electric Mfg. Company, DesPlaines, Ill.

". . . I am confident that the enameling industry will continue to grow and gain new fields once its advantages as a finish are fully recognized.

"A publication such as 'Finish' if it reaches all those connected with the production of metal products, can do much toward promoting this expansion of the industry and be of interest and help to those engaged in the design and sale of products adaptable to a ceramic finish. Likewise, it should provide a good unbiased source of technical data and practical information for operating plant personnel so vitally needed in the industry today.

"You have our assurance of complete cooperation and best wishes for success in this new venture."

G. N. Tuttle, Enameling Superintendent.

Chicago Vitreous Enamel Product Co., Cicero, Ill.

"I . . . take this occasion to congratulate you on an excellent job. I believe 'Finish' is destined to fill a real need in the Porcelain Enamel Industry as a medium free to express the pros and cons of a product necessarily rather intimately related to a wide field of manufacturing activity.

"I am sure everyone associated with the Porcelain Enamel Industry will find 'Finish' of interest from cover to cover."

B. T. Sweely, Director of Research.

Elwood Company, Ellwood City, Pa.

"We feel there is a definite need for your publication."

F. B. Maheney, Vice President in Charge of Prod.

Clyde Porcelain Steel Corporation, Clyde, Ohio.

"I believe there has been a real need for such an impartial publication for quite a long time. . . .

"If we can do anything to encourage the start and help keep it going until it is properly recognized, please do not hesitate to contact us."

R. R. Trubey, President.

***War Department, Cleveland Ordnance District,** Cleveland, Ohio.

"Thanks for sending me your new publication. It's swell and I believe you've got something that was needed.

"Best of luck." **Howard Wolf.**

* *Quotations under any War Department heading represent the views of the writer and do not represent an endorsement by the Army, Navy or any division of the War Department.*

George Koch Sons, Inc., Evansville, Indiana.

"Finish is certainly interesting and a magazine the Industry needed."

Robert B. Carter, Engineer.

James A. Stewart Advertising, Rennerdale, Penna.

"I am very much interested in your new magazine and have felt ever since I first began handling the advertising of the O. Hommel Company that a magazine of the type you propose was needed in the industry. . . . I feel this is the first time we will have the opportunity to reach the field of prospective customers that we should in a trade journal for the ceramic industry . . . "

James A. Stewart

Ingram-Richardson Mfg. Co., Frankfort, Indiana.

"The porcelain industry has long needed just such a publication."

R. J. Carter, Director of Service.

McCray Refrigerator Company, Kendallville, Ind.

"I am a great believer in the future of ceramics and frankly would welcome any sound publication which would bring us current information on the latest developments in the field. . . .

"Most of us are so busy now and doubtless will be for a period of years that we are unable to visit about very much. Consequently, we are dependent upon the material that reaches our desk for a good deal of our knowledge and any truly helpful information will be most welcome.

". . . If my thoughts as to the essential need of a publication . . . are of any value, do not hesitate to present them before anyone."

V. C. Knight, Chief Engineer.

***Navy Department, Office of Procurement and Material,** Columbus, Ohio.

"I received . . . 'Finish' today and want to congratulate you on a mighty nice job. Your new 'brain child' is well laid out and mighty attractive typographically. I sincerely believe that an independent magazine in the porcelain enameling field will fill a need long felt by the industries, and that it will be well received by everyone concerned.

"I still maintain a close interest with the enameling industry and, therefore, will appreciate it if you will place my name on the mailing list for future issues of your publication."

Byron C. Wilson, Lieut., USNR

Geo. D. Roper Corporation, Rockford, Illinois.

"Although I am not the kind of person who rushes to a typewriter and pours out compliments every time he sees something that pleases him, I do want to go on record as predicting a brilliant and very worthwhile future for your new magazine 'Finish'.

"For some time we have seen a serious need in the appliance and enameling industries for a publication dedicated to the task of providing practical workable information on technical and shop problems. . . .

"After looking over . . . Finish, we feel you are 'right on the beam.' The contents are impressive and presented in a form that's quickly interpreted into action.

"As you perhaps know, we have recently reentered the gas range manufacturing field, in keeping with governmental desires, and are now making a war model gas range, in limited number, to be sold to those critically in need of cooking equipment.

"It is our feeling that Finish will prove of material aid to us in the manufacture of these ranges and during the important post-war period of reconversion, as well.

E. H. Shands, Ceramic Engineer.

J. M. Seasholtz & Sons, Inc., Reading, Pa.

"I trust I am not the last to extend felicitations to you for such a fine piece of work as your new publication 'Finish.'

"That there was a distinct need for an independent publication devoted to Porcelain Enameling and Ceramic Finishing goes without saying and you will doubtless be of great service to the industry.

"Best of luck and an overflowing measure of success to your new venture."

E. L. Seasholtz.

Seeger Refrigerator Co., St. Paul, Minnesota.

"'Finish' will fill a long needed want for all manufacturers, and will be welcomed by all."

Carl W. Rath, Asst. Chief Inspector.

Servel, Inc., Evansville, Indiana.

"Finish should fill a long felt want in the porcelain enameling field."

Arthur A. Ullman, Process Engineer.

Westinghouse Electric & Manufacturing Company, Mansfield, Ohio.

"Without a great deal of comment, I want to congratulate you on inaugurating an industrial magazine that has been in demand for some time.

"You have handled the 'kickoff' very well and I feel confident you will continue to 'carry the ball' in the same manner."

Roy D. Beck,
Engineer Future Development Section.

University of Illinois, Urbana, Illinois.

"Very good magazine. Fills an essential need. Keep it up."

Howard R. Swift, Special Research Associate in Ceramic Engineering.

Bellevue Porcelain Enameling, Detroit, Michigan.

"Enjoyed reading . . . Finish . . . a great deal. Very interesting and instructive."

William T. Carter, Foreman Enameling Dept.

Glascote Products, Inc., Euclid, Ohio.

"It looks like a live wire independent magazine needed by the industry."

James M. Cayford, Ceramic Engineer.

BOXES and CRATES

All Types of Wooden Packages

★

HINGE CORNER

NAILED CRATES

WIREBOUND

PLYWOOD

SHOP and TOTE BOXES

★

CHICAGO MILL AND LUMBER COMPANY

111 W. Washington Street Chicago 2, Illinois

The how and why of sign advertising . . *(Continued)*

Part II

job. If they are up, he gets the advertising value he pays for. And so he features those signs in his national space, believing that one medium aids the other.

And so, from the foregoing, it is apparent that signs serve as potent aids to other forms of advertising—aids so essential that the advertiser gains tremendous advertising value from his other media when thorough sign coverage provides the follow-through at the time and place of sale.

The major uses of sign advertising may be grouped in five broad classifications:

1. They identify and lead purchasers to the advertiser's outlets.
2. They tie in with and give maximum effect to other forms of advertising.
3. They create immediate sales—either reminding the prospect of his needs, or by creating the need on the spot.
4. They do an institutional advertising job.
5. They carry on a general mass advertising campaign.

The first four uses have been briefly illustrated. Throughout this text other examples from a variety of businesses will be given. At this point, let's consider the fifth use—

A mass advertising medium

Signs as a general mass advertising medium haven't had the attention they deserve as measured in value. Recognizing their value as a low-cost medium for extensive mass promotion, some alert advertisers have monopolized the field thus far, and with such successful results that they are beginning to attract wide spread interest.

Mass advertising in this sense refers to the collective effect of dealer signs entirely apart from their identification job—the poster advertising effect of signs on a thousand store fronts in shopping centers throughout a marketing area.

At first thought it scarcely seems reasonable that the mass advertising value of signs could have been overlooked. Yet that is often the case. An advertiser who is completely sold on the value of outdoor *(poster)* advertising as a medium, and pays the reasonable price asked for it without a murmur, often gives no thought to the value of the same kind of advertising which he can obtain even nearer the point of sale—on the dealer's storefront itself. And he can do that kind of advertising for the comparatively insignificant price of supplying the dealer with an appropriate sign and helping him put it up!

Signs must be appropriate

The dealer wisely enough will not permit the use or help pay for "just any sign." It must be *appropriate*. If it is, the chances are exceptionally good that any advertiser can get his sign erected. Before the war the Schlitz Brewing Company's neat, 16" porcelain enameled circle sign appeared before some of the finest restaurants and clubs. The sign was appropriate. It detracted nothing from the artistic front, and up it went. It did a selling job in spots where most advertisers would have overlooked a real opportunity.

The advertisers who have recognized the value of signs as a mass advertising medium have reaped profits as a result. This is particularly true of the soft drink bottlers. A sign survey of Peoria, Illinois, made in connection with the research behind these articles, suggested the possibility that Coca-Cola signs were not necessarily allocated to outlets on the basis of the sales of each store. In other words, it appeared that if an outlet had a front that offered good mass advertising value a large sign was erected, regardless of the amount of Coca-Cola sold at that outlet.

With this suggestion in mind, various advertisers throughout the country were questioned as to their basis for allocating signs. They were asked whether or not they gave any attention to advertising value entirely apart from the provision for identification justified by the sales of the particular outlet.

Mass advertising value in store front signs

A leading bottler of ginger ale and related products in the Eastern territories has given considerable study to sign advertising as a part of their display program in recent years. When an outlet is recommended for a sign, the display department sizes up the front and considers the advertising possibilities of the location in terms of traffic. They determine the size and quality of the sign to be erected by considering the poster advertising value they will get.

The cost of mass sign advertising on store fronts includes, of course, the cost of the sign itself, the cost of sales effort to get it used, and the cost of erecting it. Because it takes about the same effort to persuade a dealer to use any type of sign, and roughly the same erection cost, obviously it is more economical to erect a sign with a long life than one with a short life.

To clarify this further, take the case of a company in the food field. When they could still supply signs they were paying $1.50 to an erection company in New York City to get their signs hung on grocery and other food outlets. The cost of this particaulr flat metal single-faced sign was $2.06—little more than the erection cost. This sign will last no more than two or three years, possibly less, making the erection cost a minimum of 50 cents a year. If the sign were made of sturdier material — porcelain enamel, for example—with an average life double or triple this length of time, you can readily see how it would reduce the erection cost per year of advertising value.

Mass advertising differs from identification advertising to the extent that it helps make a sale that may not be made at the outlet carrying the sign. In other words, if a motorist drives by half a dozen roadside stands on a hot day, each carrying an inviting illustration of a sparkling cold drink, his sales resistance is going to be pretty well worn down by the time he reaches the seventh one. Each sign adds to

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the selling job being done, and the final sign (whether it be the third or the tenth) serves, insofar as that particular customer is concerned, as an identification sign. The others did a mass advertising job.

This obvious example illustrates what can be done for many products with wide distribution. Repetition of the package, the identifying selling phrase or slogan, and the name on the signs at the outlets throughout a marketing territory—mass advertising at a cost so reasonable that many have overlooked it entirely— is available to advertisers who will furnish appropriate signs to dealers.

Illustration of the mass advertising value of signs is common among the users of roadside signs. Burma Shave introduced their product, gained distribution for it, and sold it to consumers through sign advertising, and sign advertising alone, for a considerable period.

Signs sell coal

The Sahara Coal Company, a 12 to 15 million dollar coal marketing organization covering 12 Midwestern states, signed up dealers on the strength of the demand created by the signs they placed along main thoroughfares leading into cities where they desired distribution. And they reported many instances similar to this typical one:

One of their Iowa dealers had attempted to sell Sahara Coal to the manager of an estate in his city for several years. The manager continued to buy an old line of coal, a product in which he had considerable confidence. And then he took a motor trip to the South. All along the way down and back, according to his testimony, he saw the Sahara Coal signs along the highways. When he returned he 'phoned the dealer and asked him to come over and talk about coal. After the order was signed, the dealer asked for the reason and the man replied, "A company that has customers over the entire area I covered must be good; I didn't know the Sahara Coal Company was that large and substantial."

The job the Sahara signs did in this instance might be included in the "institutional" classification. As in any analysis of the ways in which other types of advertising work, there is an obvious overlapping. This classification of the objectives of sign advertising performs its service if it simply makes the point that sign advertising does more than identify—it sells goods. It is useless to draw the definitions of each classification so fine that no overlapping will result. The fact is demonstrated that signs serve, and serve well, in several distinct ways.

What has been the practice of advertisers in furnishing signs to dealers? What is the condition of signs put up in years past? Read the answers to these questions and data on the experiences of large organizations such as Goodyear, International Harvester, etc.

What responsibility should the advertising department assume—the engineering department? This and other information you can get in Part III of this series to appear in the June issue of *finish*.

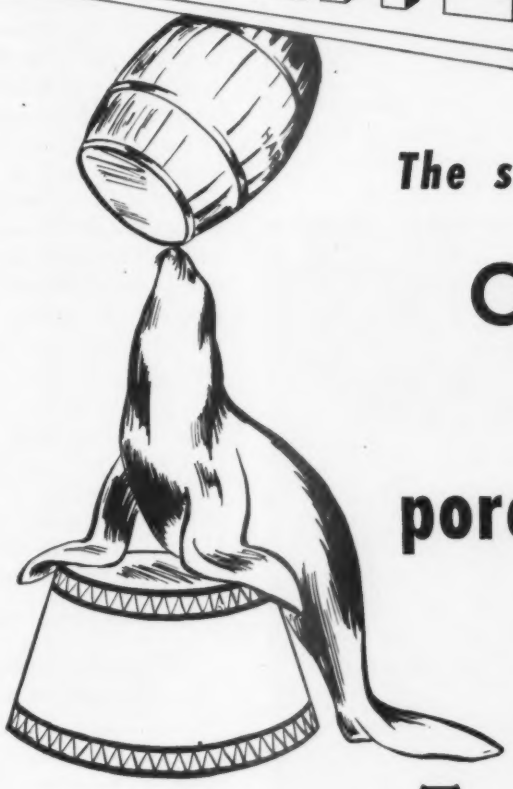
IT'S BEAUTIFUL
—BUT WILL IT BAKE CAKES?
● You are hearing a lot about revolutionary designed cooking appliances. But . . . will they be practical? How will they perform? Those are the first questions clients and buyers will ask when they see the completely equipped kitchens in the homes you design for postwar living and postwar selling. That's one more reason why you will want to specify and install pre-tested Gas Ranges bearing the famous CP Seal of Certified Performance. For, as 85 million Americans know, the CP Seal certifies tops in cooking perfection, low cost operation, trouble-free service, the most advanced automatic controls PLUS big savings in time, fuel, food and money.
CP Gas Ranges are made by America's leading Range manufacturers to meet the highest performance standards created by engineers and home economists of the entire Gas industry. The CP Seal will be the symbol your clients and buyers will look for in kitchens of tomorrow.
* * *
For complete information on CP Gas Ranges, write to Association of Gas Appliance and Equipment Manufacturers, 60 East 42 St., New York 17, N. Y.
Gas Ranges bearing the CP Seal are manufactured by:
A. B. Stoves, Inc.
American Stove Co.
Celoric Gas Stove Works
Clare Bros. & Co., Ltd.
Cribben & Sexton Co.
Detroit-Michigan Stove Co.
The Estate Stove Co.
Glenwood Range Co.
James Graham Mfg. Co.
Grand Home Appliance Co.
Hardwick Stove Co.
Hoffats, Ltd.
O'Keefe & Merritt Co.
Roberts & Mander Stove Co.
Geo. D. Roper Corp.
Standard Gas Equipm't Corp.
The Tappan Stove Co.
Western Stove Co., Inc.
CP Gas Range
AMERICA'S SYMBOL OF CERTIFIED PERFORMANCE

Under the auspices of the Association of Appliance and Equipment Manufacturers a new promotion program is being launched by the manufacturers of Certified Performance Gas Ranges.

Two-color ads are being run in the gas and appliance magazines, architects and builders magazines, and additional services include posters, bill stuffers, counter pieces, newspaper mats, letterhead stickers, and publicity releases being distributed through A.G.A.E.M. headquarters, 60 E. 42nd Street, New York 17, New York.

The general plan is designed to aid the war effort and to provide more jobs after the war. War Bonds are tied in effectively.

UVERITE



The smoothest performing

OPACIFIER

for

porcelain enamel

The smooth performance of Uverite makes it the outstanding mill addition opacifier for porcelain enamel. A whiter, better surface with fewer defects is an important reason why enamelers use more Uverite than any other opacifier.

HARSHAW

THE **HARSHAW CHEMICAL** CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

230 million dollars worth of production. *(Continued)*

Sales of Porcelain Enameled Products

	1939	1943	V +
Signs	$ 3,849,122	$ 241,201	$ 4,500,000
Architectural Parts	1,794,729	(1)	3,500,000
Stoves & Ranges	53,230,151	7,651,000	60,000,000
Refrigerators	40,752,525	651,000	82,000,000
Washing Machines	3,454,284	(1)	7,000,000
Plumbingware	43,357,286	4,184,678	48,000,000
Kitchen & Hospital Ware	15,139,744	21,545,000	15,000,000
Table Tops & Drainboards	4,070,896	(1)	5,000,000
Reflectors	1,835,572	5,061,897	2,000,000
All Other	3,425,539	4,233,499	3,500,000
Total	$170,909,848	$43,568,275	$230,500,000

(1) Included with "All Other" to avoid disclosure of individual operations.

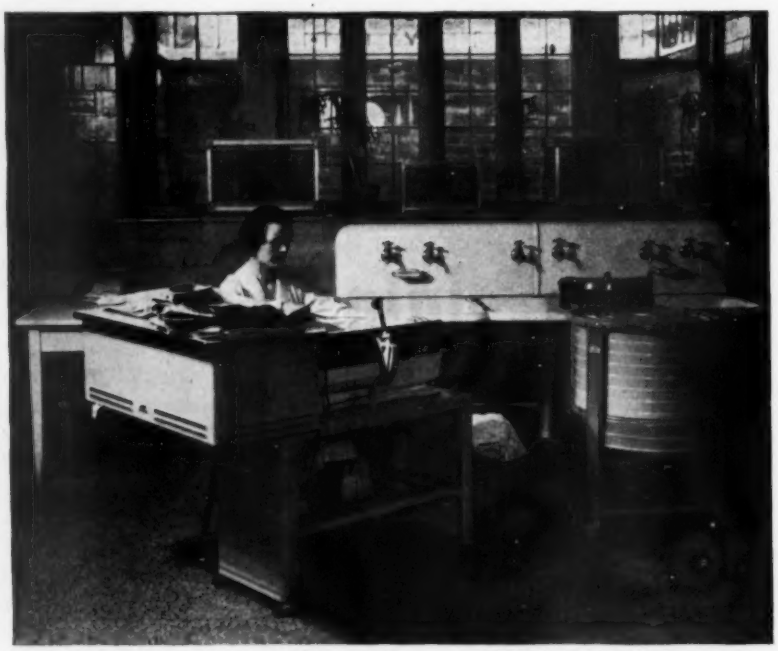


PHOTO COURTESY ALTORFER BROTHERS COMPANY

The laundry is, and should continue to be, an important outlet for porcelain enamel. Washing machines, ironer tops and parts, table tops and, in some instances, laundry tubs combine to make important business for enamelers for postwar production.

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lion in 1939 to $5 million in 1943 due to various plant expansions and the practice of flood-lighting the exteriors of certain key war production plants for security reasons. Future output of such enameled reflectors should be at least $2 million annually.

The "all other" classification of some $4 million includes a great variety of items, some of which are manufactured under military contracts at present, such as spark arrestors, stove pipe, film reels, aircraft engine manifolds and the like. The use of procelain enamel for manifolds and exhaust stacks for airplanes is a new use, and one that is increasing in importance. Many other components of military aircraft, such as fire shields, gun tubes, etc., are being investigated with the idea of using a porcelain enamel finish. The work already done on manifolds indicates a possible new peacetime market if the idea can be successfully sold to the automobile and aircraft industries for use on mufflers and exhaust pipes. The slightly increased first cost due to enameling should easily be made up by greater service life of the parts because of elimination of corrosion of the steel.

Worthy of mention here is the new development of low-fire alumina-alkali inorganic finishes which are matured at temperatures of 350° to 1,000° F. as compared with normal enameling temperatures of 1540° to 1650° F. These new finishes, already commercially available under several trade names, have certain of the desirable properties of high-fired porcelain enamel and in some applications can be applied at a cost much less than that of conventional porcelain processing. The advent of the new finishes should augment the present field, making inorganic finishes available at a lower cost than heretofore.

Note: This article is abstracted from a more comprehensive paper covering the entire Ceramic Industry which Mr. Newcomb presented April 4 at the American Ceramic Society Annual Meeting in Pittsburgh, Pa.

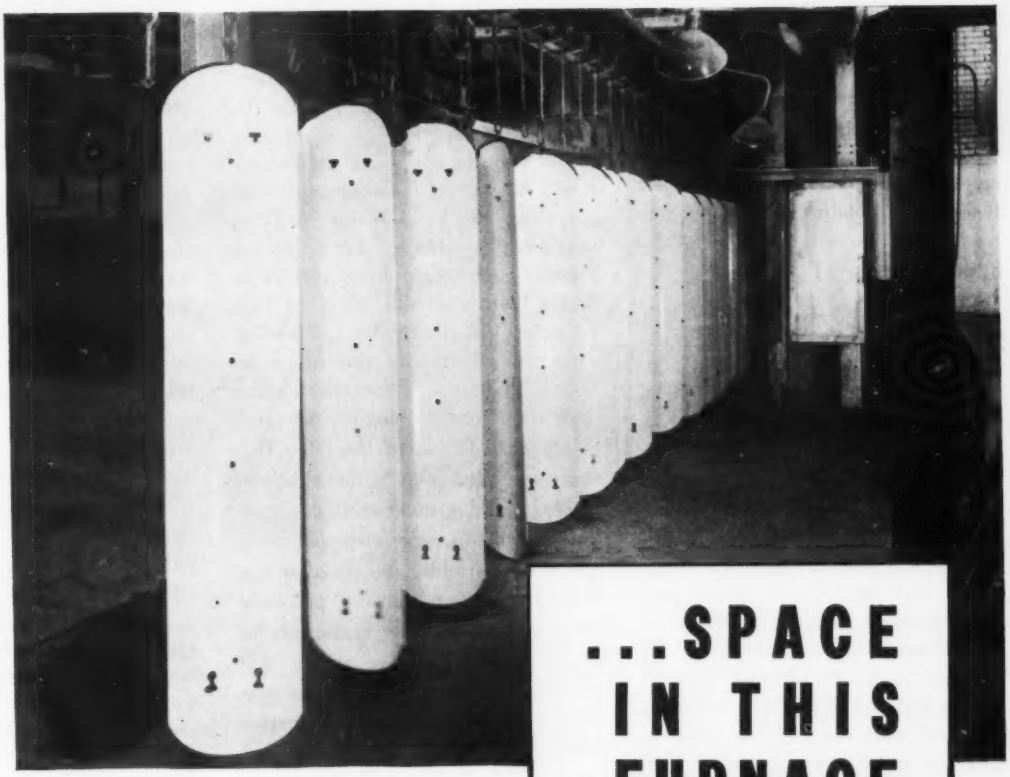
Better housing needed for women war workers

Group housing for women in industry is the best solution for problems caused by the overcrowding of facilities for war workers in boom towns, the Women's Bureau of the United States Department of Labor suggests.

Better accommodations in all types of living quarters are needed throughout the country, it was found in a survey made by the bureau in cooperation with leading women's organizations. Inadequate control and regulation of boarding and rooming houses is nationwide, the bureau's report said, and younger employees in the low income groups especially are declared to need supervised residence halls and clubs.

The findings and recommendations of the bureau and its advisory group are in Special Bulletin 17, "Progress Report on Women War Workers Housing," and can be obtained for five cents from the Superintendent of Documents, Washington 25, D.C.

FOR SALE...



...SPACE IN THIS FURNACE

Manufacturers of fluorescent lighting fixtures can have their reflectors stamped and enameled in a plant that hasn't shut down during the war; or we will take your fabricated reflectors and enamel them.

We did a good job before the production of porcelain enameled reflectors was restricted. We can do it again.

VITREOUS STEEL PRODUCTS CO.
BOX 1791, CLEVELAND 5, OHIO *(Factory at Nappanee, Ind.)*

The application of low pH cleaning . . *(Continued)*

operation. This smut of iron carbide, is very active chemically and may oxidize rapidly to other iron compounds. Also, it tends to entrap residual acid and ferrous sulphate from the pickle, which carries over on the surface to the neutralizer, and is there converted to soluble salts of sodium, and insoluble salts of iron. These residues normally dry on the steel surface, and if present to excess, may interfere seriously with proper fusion and bonding of the enamel.

Bright pickling

Investigations are now under way to determine what constitutes the ideal surface for enameling, and although the work is far from complete, some of the early results may be of interest. Porcelain coatings have been applied to several types of pickled surfaces, ranging from deeply etched and over-pickled stock to lustrous, bright pickled stock. The latter is a recent development which permits chemical cleaning superior to sand blasting or hand scouring. In one type of bright pickling the surface is first etched in the usual manner, and then the pickling smut is removed in a second pickle. This surface retains the rough matte microcontour of conventional pickling, but is entirely free of any trace of smut.

In another type of bright pickle all foreign matter is removed from the surface and, instead of etching, considerable luster develops. In both cases the resulting surface is somewhat passive; that is, it resists oxidation. This is in contrast to the conventional pickled surface, which is very active and subject to rapid oxidation, especially at the temperatures encountered in ceramic firing. The use of these various types of pickle is expected to throw some light on what the cleaning and pickling procedure should be in connection with the use of all-white porcelain coatings. It is already apparent that the white-matte surface is preferable to a bright smooth surface for dipping, due to its better holding power on the slip. As for bond, the evidence so far indicates that a moderately passive surface is conducive to better bond as compared with a highly active surface which oxidizes excessively in the firing operation.

Here again it must be stated that the surface condition is important only in its relationship to other factors. For example, two different ground coat compositions may be greatly different in their combining power with the iron oxide on the surface. Therefore, one ground coat may fuse and bond readily with an over-pickled surface, where another ground coat would break out with "boils," on a similar surface. This indicates the desirability of having some control over the rate of oxidation of the steel surface during the early stages of the firing period, prior to complete fusion of the frit. This ties up definitely with cleaning, pickling, and ground coat composition — with furnace atmosphere as an added variable. We have shown that cleaning can have a profound effect on the rate and uniformity of pickling, and we have shown that pickling may be controlled to produce various conditions of surface activity with respect to subsequent oxidation in firing.

Adhesion and oxide diffusion

Probably the most important effect of neutralizers and nickel baths are their influence on the degree of oxidation of the surface in firing. In one series of tests, in which test panels were enameled directly with white cover coat over different types of surface, the degree of oxide diffusion in the enamel coating was observed. On a surface which was etched to a clean matte finish, free from smut and slightly passive, the oxide diffusion was moderate, and the bond was good under impact test. Another surface was pickled as usual, leaving a gray, active surface; oxide diffusion was greater and the bond was poor.

In this brief article we have tried to present an over-all conception of the essential features of good cleaning and preparatory treatment. We are fully aware of the great amount of pioneering still to be done, but it is characteristic of industrial progress that improvements are made gradually as the result of many individual technological contributions.

We believe that porcelain enameling will remain unchallenged by other materials or finishes in the post-war world, and that, with continued progress in technology, the ceramic industry will expand into new fields of usefulness which are now unforseen.

W.P.B. concerned about appliance repair services

(Continued)

regulation, a repairman may also buy as much other material and repair parts as he needs for his maintenance and repair work.

To buy these materials and parts a repairman need merely certify on his purchase order, in the form specified in the regulation, that he is applying the allotment symbol of V-3 and the preference rating of AA-3 which has been assigned by CMP Regulation 9-A. This eliminates the necessity of the repairman filing WPB-541 (formerly PD-1A) or CMP 4B applications and waiting for ratings or symbols to be assigned to him.

Up to $25 worth of material may also be used *to install any unit* of *cooking*, *plumbing*, *heating* or used *air-conditioning* or *refrigeration* equipment.

Although CMP Regulation 9-A was originally issued last November 25, letters from repairmen and a cross-country check of many repair shops has indicated that many repairmen are not familiar with the simplified form of obtaining parts and materials, WPB said. While some 100,000 repair shops are scattered throughout the country, no record of all repair shops and their locations is available, WPB said. It is therefore, impossible for WPB to contact each shop individually to inform them of the existence of the regulation, the agency explained.

WPB is particularly concerned about keeping present appliances and equipment in operation.

NOW— MORE THAN EVER

IT'S "PLANT—TESTED"

EACH DAY thousands of pounds of PORCELFRIT are being used in the vast Ing-Rich jobbing shop to manufacture needed products for the Armed Forces and civilian requirements — more proof that Ing-Rich frits are "plant-tested".

True, all Ing-Rich frits are closely scrutinized by the watchful eye of the PORCELFRIT Laboratories but the rigid, practical tests they receive in the plant are what really count.

When you order porcelain enamel frit, you desire one that will work day in and day out in your plant where conditions may change every hour.

That is why you should always use Ing-Rich PORCELFRITS in your own plant—a frit which has been "plant-tested" for over 40 years.

Next time order Ing-Rich "Plant-Tested" PORCELFRIT — the complete line is available at all times.

INGRAM-RICHARDSON MFG. CO.

OF INDIANA · INCORPORATED
FRANKFORT · INDIANA

A COMPLETE ENAMELING SERVICE

College interest in instruments . . *(Continued)*

from a few hours a week to 40 and 48-hour weekly periods. In addition, some students are putting in full-time war work on night shifts. Our students are coming from Sweden, Mexico, South America and from Asiatic countries. Many of the students have come to our school from some of the largest industrial organizations in metals, oils and other industries. A large number of our students pay their own keep and lodgings while studying. Still other men and women have come to us from trades and professions having little or no connection with instrumentation. They include salesmen and others who seek a new and brighter future by way of the industrial instrument field.

A top-flight instrument man must be a mechanic, electrician and an operator. He must have complete knowledge of the instrument and its parts. He must be able to re-assemble every one of many types and models. He must know the basic principles of applications and process control.

The results of what we and others do now, and soon, may represent the difference between re-establishment of free enterprise as we have known it, or loss of much of our pre-war independence of action and initiative. From the purely selfish standpoint alone it is necessary that industry take upon itself the task of meeting post-war industrial educational demands until such time as some educational system can be established that will do the job as well or better.

I believe the day will come when the larger colleges and trade schools will include instrumentation as a major part of specific courses and will give this subject the necessary time demanded by its technical character and importance. Until that time arrives industry must depend upon itself. It must initiate a program that will be wholly representative of the newer perspective for all private endeavor.

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